

**VIETNAM NATIONAL UNIVERSITY – HCMC
INTERNATIONAL UNIVERSITY
SCHOOL OF INDUSTRIAL ENGINEERING & MANAGEMENT**



PROGRAM SPECIFICATION

PROGRAM LEVEL

BACHELOR OF ENGINEERING

IN INDUSTRIAL AND SYSTEMS ENGINEERING

2019



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PREFACE

The ISE program was found in 2014 and has been reviewed annually. In 2015-2016 and 2016-2017 years, there were minor revisions of the program curriculum such as changing prerequisite courses, switching between elective and compulsory courses and the semester of study. Since then, the ISE program has remained unchanged to date. Information of the program specification has been made known to students via the Department website and student handbooks published every new academic year. In order to reach more interested stakeholders and also comply with the recommended practice of AUN accreditation from the assessors of AUN-QA Assessment, this Program Specification book was published in June 2019 with a more complete information of the program and is applicable from Batch 2019 onwards.

PROGRAM SPECIFICATION

The Program Specification published in 2019 is updated from 2017 mainly with the information of School of Industrial Engineering and Management and revised curriculum for Batch 2019 onwards.

1. Introduction to School of Industrial Engineering & Management

The Industrial and Systems Engineering Department at IU-VNU was founded in 2009 in response to the needs of the development of the industry and service sectors in Vietnam. Due to the growth in the number of students of the Department, it has changed to School of Industrial Engineering & Management in 2019, which manages the programs of Bachelor of Engineering in Industrial and Systems Engineering, Master of Engineering in Industrial and Systems Engineering, Bachelor of Engineering in Logistics and Supply Chain Management, and Master of Engineering in Logistics and Supply Chain Management.

Vision

Take leadership role in education and research in the field of Industrial and Systems Engineering in Vietnam.

Mission

- Offering high-quality graduate and undergraduate education in the field of Industrial and Systems Engineering
- Offering excellent research including basic and applied research in the field of Industrial and Systems Engineering to meet the needs of industry, local provinces and society.
- Taking the pioneer role in developing the Industrial and Systems Engineering field in Vietnam by promoting the application of Industrial and Systems Engineering in a variety of production and service sectors in Vietnam

Objectives

The School of Industrial Engineering & Management views itself as a system in which students are both important input and output. Therefore, students are the main driver for all activities. In particular, its objectives are to:

- Maintain an excellent quality of teaching and learning
- Recruit and retain highly qualified faculty and staff to support the teaching, research, and service mission in the Department of Industrial and Systems Engineering
- Enhance the learning environment to support the teaching and research activities
- Attract excellent local and international students
- Enhance the collaboration with industry and other prestigious educational institutions

The IEM currently offers four programs: (1) Bachelor of Engineering in Industrial and Systems Engineering, (2) Master of Engineering in Industrial and Systems Engineering, (3) Bachelor of Engineering in Logistics and Supply Chain Management, and (4) Master of Engineering in Logistics and Supply Chain Management.

Program

- **Language:** English is the official language used in all teaching and research activities.
- **Types of Program:** The Industrial and Systems Engineering program is fully conducted at IU-VNU. Students are awarded the IU-VNU degree once completed the program. (IU program)

Qualification

- **The Bachelor Degrees are awarded by IU-VNU**
- **Degree title:** “Bachelor of Engineering in Industrial and Systems Engineering”

2. Intended Learning Outcomes

The program ELOs are adopted from ABET criteria for Student Outcomes of general engineering programs. Since 2019, ABET has revised its required Student Outcomes from 11 criteria (a to k) to 7 criteria. The new set of ABET Student Outcomes is indeed a condensed version of the old one and there is no major change in principle. *The program ILOs was consequently revised according to the new ABET set of Student Outcomes in 2019*

The Program ELOs from 2014 to 2019 as adopted from ABET Student Outcomes before 2019

(Note: The term ELOs is used for batch form 2014 to 2018)

	Expected learning outcomes (ELOs)
a	An ability to apply knowledge of mathematics, science and engineering
b	An ability to design and conduct experiments, as well as to analyze and interpret data
c	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d	An ability to function in multidisciplinary teams
e	An ability to identify, formulate, model and simulate and solve engineering problems
f	An understanding of professional and ethical responsibility
g	An ability to communicate effectively
h	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i	A recognition of the need for, and an ability to engage in life-long learning
j	A knowledge of contemporary issues and ability to self-update
k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

The Program ILOs from 2019 as adopted from ABET Student Outcomes after 2019

(Note: The term ILOs is applicable from Batch 2019 to present)

	“New” Intended learning outcomes	Relations with the “Old” ELOs
ILO1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	a, e, k
ILO2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	c
ILO3	An ability to communicate effectively with a range of audience	g
ILO4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	f, h
ILO5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	d
ILO6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	b
ILO7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	i, j

3. The Program Objective

The current set of the ISE Program Objectives is posted on the ISE Department website as listed below:

Within 3-5 years of graduation, graduates of the Bachelor of Engineering in Industrial and Systems Engineering Program are:

1. practicing engineers in the field of Industrial System and Engineering, who
 - (i) Design or redesign Industrial System Engineering system
 - (ii) Operate and manage Industrial System Engineering system
 - (iii) Improve the existing Industrial System Engineering system
 - (iv) Support for wise decision making
2. Engaging in lifelong learning to maintain and enhance professional skills
3. Working effectively with people and demonstrate leadership, professional skills and ethical behavior in the workplace
4. Fulfilling the needs of the community and industrial sector of Vietnam in solving Industrial System Engineering problems using industrial and systems engineering principles, tools and techniques.

The program objectives of the ISE program were determined by the program faculty with a consultation and analysis of visions and missions of the university and the needs of stakeholders. PO#1 refers to key abilities of ISE engineers, which requires the graduates as an engineer not only able to operate and manage an existing system, but also able to design a new system or improve it. The “design” ability is traditionally and internationally recognized a requirement of engineering, which distinguishes an engineering program to a business program. PO#2, lifelong learning and PO#3, human skills are requirements of all stakeholders. Thus, PO#1 and #2 satisfy the first mission of IU to offer high-quality graduate and undergraduate multidisciplinary education in general and in the field of Industrial System Engineering in particular. PO#1 and PO#4 also imply the capability of doing research and service for community and society, the second mission of the university. PO#4 contributes to promoting the application of Industrial System Engineering in a variety of production and service sectors in Vietnam, which is relevant to the third mission of the university. The POs of the ISE program are consistent with the missions of the institution as shown in the Table below

Consistency of the POs with the Missions of the Institution

University Missions	ISE Program Objectives			
	PO #1	PO #2	PO #3	PO #4
Offering high-quality graduate and undergraduate multi-disciplinary education, striving for all educational programs to be internationally recognized and accredited (AUN and ABET).	X	X	X	
Offering excellent research including basic and applied research to meet the needs of industry, local provinces and society.	X			X
Taking the pioneer role in Vietnam by practicing management excellence, inspiring and assisting other VNU members in the advancement toward the development of Vietnam National University – HCMC as a whole.		X	X	

4. Job opportunities

ISE engineers can take on and perform excellently tasks in various fields, namely Industrial and Systems Engineering, Procurement Management, Project Management, Inventory Management, Quality Management, Production Management, Optimization in Production and Service, developing an integrated solution to reduce the operation cost, etc. Qualified graduated engineers can achieve the top-level positions in organizations such as Production Director and Chief Executive Officer.

5. Program offering

- **Awarding body/institution:** International University HCMC
- **Teaching institution:** Department of Industrial and Systems Engineering, International University HCMC
- **Accreditation:** MOET standard, 2014
- **Name of the final award:** Bachelor of Engineering in Industrial and Systems Engineering
- **Program Title:** Bachelor of Engineering in Industrial and Systems Engineering
- **Admission criteria of the program:**
 - Admission via the National High School Achievement Exam
 - Admission based on Academic Records of the Candidates at the 10th, 11th and 12th

Grades of Designated High Schools

- Admission for candidates with national and international awards
- Admission via Scholastic Aptitude Exam held by IU
- Admission via Scholastic Aptitude Exam held by VNU
- Admission for candidates with International Baccalaureate

● **Course Assessment:**

According to the Academic Regulations of IU-VNU, the assessments fall into three categories as follows:

- Final exam: 35% - 60%
- Mid-term exam: 20% - 40%
- Others (homework, assignment, project): 10% -30%

The final grade of a laboratory course includes:

- Laboratory assignment: 70% - 80%
- Laboratory final exam: 20% - 30%

6. Teaching and learning Approach

6.1 The educational philosophy is well articulated and communicated to all stakeholders

IEM follows the university educational philosophy which is published on the university website. The recent educational philosophy has been announced in 2018 in a university retreat for school and department representatives. The educational philosophy is clearly communicated to all stakeholders on the website, leaflets, and student's handbook. In addition, through the workshops and field trips, the educational philosophy is presented to different partner organizations. IU educational philosophy can be summarized as comprehensive, liberal and global.

Comprehensive: IU offers multiple programs in diverse disciplines, ranging from science and technology to social sciences and the humanities and aims at training all-round individuals

Liberal: aims at developing each student's potentials to the fullest and equip them with necessary knowledge and skills, getting them ready for a complex, diverse and changing world.

- Students are encouraged to develop their free and critical thinking.
- Students are equipped with not only specific professional knowledge but also a broad knowledge base, not only professional expertise but also necessary soft skills such as rhetoric, critical thinking, independent learning, teamwork, leadership, etc.
- Free and critical thinking goes hand in hand with a sense of responsibility (for themselves and the community).

Global: IU aims at building an internationally oriented community of scholarship, aligned with the global integration policy initiated by the Vietnamese national government.

6.2 Teaching and learning activities are constructively aligned to the achievement of the expected learning outcomes.

The lecturers are to develop expected learning outcomes of the courses they are in charge of, teaching and learning activities to achieve the learning outcomes and assessment scheme. In the ISE program, the following teaching and learning activities are highlighted.

Student oriented

While different lecturers may employ different teaching and learning strategies, the ultimate goal is always to bring the most to students, i.e. what the students need. Thus, at the beginning of each semester, all the students receive individual counseling from their assigned advisors on the subjects to be taken, which suit their individual ability and needs. At the beginning of the course, course objectives and syllabus are introduced to the students in order to help them become aware and appreciate the role of the course in the whole designed curriculum as well as how it is relevant to their future job. These objectives are repeated and highlighted in each lesson to strengthen students' motivation throughout the course. In addition, students are encouraged to actively get involved in the lesson through discussion, problem solving, games, and assigned reading in advance. These activities are to assure students can remember, understand and apply what they learned.

Collaborative learning

Group work in assignments, projects, laboratory experiments are common in most of ISE courses. Thus, students can learn how to work cooperatively and support each other, develop effective teamwork and communication, assimilate multiple views to deepen knowledge and promote critical thinking. These are also directly linked with the ILOs (1) and (5) . Lecturers use different approaches in forming teams, promoting interdependence and individual accountability to assure the benefit of cooperative learning.

Integration of theories and practices

Integration of theories and practices is emphasized in the ISE Program. The ISE department is equipped with simulation lab, work design & ergonomic lab, human machine interface lab, product design and development lab and FMS lab, which allows students to improve professional software, running simulation, doing experiments and get familiar with common equipment used in the industry. Junior students can start to get hands-on experience right in their early years in the program by participating in different projects in the Introduction to ISE course. Student's are encouraged to spend time in the lab working with each other on class assignments and projects. Labs are opened 24/24 for students doing projects upon request.

Students learn to correlate their acquired knowledge in school with industry practice in many ways. Each student experiences two internships and several field trips throughout their study in the

ISE program. The first internship prepares junior students hand-on experience in advance, which will benefit them later when they learn related courses in their senior years. The second internship provides senior students opportunities to apply learned knowledge and practice their analysis skill and creativity in real cases. In addition, speakers from industry are also invited to share their experiences in relevant topics taught in different courses of the program.

Experiential learning

The teaching strategy also provides students with experiential learning which develops through the activities such as simulation & modeling, focused imaging (case studies, video), games, experiment. Through these activities, lecturers encourage students to observe, analyze and draw lessons for themselves.

Utilization of IT

Each classroom is well-equipped with a computer, projector and board. Blackboard system supports lecturers in providing course materials, making announcements to class. Lecturers can use professional software (Turnitin Originality Check) to teach students proper citation methods as well as to safeguard against potential plagiarism. Discussions between teachers and students are not limited to class hours; students can consult lecturers via emails, Facebook or in the office.

6.3 The teaching and learning activities enhances life long learning

The fact that all classes are conducted in English helps students practice and improve their English competency, an important skill for life-long learning. Group projects help students to develop problem solving skills, critical thinking skills and teamwork ability. Students also learn by searching references, correlating their acquired knowledge with the real problems. The ISE students are also particularly strong in IT skills because they have to apply programming and advanced software to solve real problems of large scale.

7. Student Assessment

7.1 The student assessment is constructively aligned to the achievement of the expected learning outcomes

Overall

All the Program Intended Learning Outcomes (ILOs) are translated into specific Course Learning Outcomes (CLOs) which are shown in every course syllabus. The achievement of the Program ILOs thus can be evaluated via the measurement of achievement of the CLOs.

The ILO evaluation cycle is 4 years. The evaluation process follows the following steps:

- PLAN

- + Faculty meetings were held to select courses which most clearly reflect the requirements of each ILO for the assessment, decide semesters for data collection, lecturers in charge of the related courses and appoint the Assessment Leader.
- DO
 - + Lecturers decide method and form of evaluation of CLOs that contribute to the chosen ILOs as well as set target of achievement
 - + Lecturers collect assessment results and submit to the Assessment Leader
 - + Assessment Leader compile the results and report to the Program Chair and Head of the School
 - + School Assessment Leader compiles the results and report to the Program Chair and Head of the School
- CHECK
 - + Faculty meeting to discuss necessary acts upon the assessment results
- ACT
 - + Changes are applied and monitored based on the meeting conclusions.

Course assessment

Lecturers in charge of specific courses have to develop course learning outcomes which can be related to the program ILOs. The relation between course learning outcomes and program ILOs are made explicit in the course syllabus. Based on the course learning outcomes and course contents, lecturers design quiz, assignments, midterm, final exams and projects. Different forms of assessment are utilized to be able to assess students' acquired knowledge and skills at different levels of Bloom taxonomy. Direct assessment includes quizzes, assignments, midterm exam and final exam. These assessments use different kinds of questions such as multiple choice, essays, or written tests.

Internship assessment

Students' soft skills, attitudes and abilities of applying learned knowledge and solving problems are evaluated through internship.

Thesis assessment

Thesis is the final assessment of the program. It often takes one semester for students to complete their theses. Lecturers provide a list of thesis topics or their interest research areas. Students are encouraged to choose a thesis topic that is related to the existing problems of their intern companies. Thus, the thesis is considered an overall assessment of students' ability to apply their learned knowledge and skills to solve real problems.

7.2 The student assessments including timelines, methods, regulations, weight distribution, rubrics and grading are explicit and communicated to students

Entrance assessment

To be enrolled into the program, the potential students are assessed via different methods

which based on the results of either (1) National High School Achievement Exam, (2) Academic Records of the Candidates at the 10th, 11th and 12th Grades of Designated High Schools, (3) national and international awards, (4) Scholastic Aptitude Exam held by IU, (5) Scholastic Aptitude Exam held by VNU or (6) the International Baccalaureate. The passing score of each scheme is determined and made known to all the stakeholders by the university every year.

Course assessment

Regulation of course grading and classification is stated clearly in the Academic regulation and made known to student via student handbook and website. According to IU regulation, the performance of students is assessed by the following methods with their corresponding weights:

- Final exam: 40% - 60%
- Mid-term exam: 20% - 30%
- Others (e.g. In-class quizzes, group presentation, etc): 20% - 30%

Other information such as detailed assignments, timelines, rules on late submissions, or rules against plagiarism is provided by the lecturers at the beginning of the course.

Internship assessment

There are two internships in year 2 and year 3 in the program. For the Internship 1, students are required to take a field trip to 5 companies while the internship 2 requires students to work in a company for at least 8 weeks. The internship is evaluated based on the quality of the internship report that the students submit to the school as well as feedback from the company supervisors on the students' performance and conduct. Details of the Internship evaluation criteria are stated in the internship syllabus and made known to students at the beginning of the internship.

Thesis assessment

Regulation of thesis assessment is made known to students via student handbook and website. Thesis assessment process is announced to the students at the beginning of the semester. The thesis is evaluated throughout three stages: thesis proposal, midway defense, and final thesis defense. Guidelines of thesis proposal, final report format, evaluation rubrics, are also made known to students. After completing the thesis report, the students are required to defend their works before the thesis committee, which includes the department faculties and outside reviewers. Before presenting in front of the thesis examination committee, the student must obtain a positive recommendation from his/her thesis advisor. If there are disagreements between them, the Chair of Thesis Committee will be consulted to find a solution. If a student fails at the thesis presentation, he/she can ask for a prolongation or to change the thesis advisor or thesis topic. In any case, the

duration of the entire study cannot exceed the permitted time, which is 6 years, determined by IU.

7.3 Methods including assessment rubrics and marking schemes are used to ensure validity, reliability and fairness of student as assessment

The exam organization process follows the school regulation. The lecturers are required to make new assessment questions every semester while assuring that the assessment content reflects its relation with the course learning outcomes and the taught lessons as described in the assessment plan developed by the lecturers. All the exam papers need to be approved by the school Dean to assure its validity and reliability based on the assessment form and assessment content. Assessment rubrics and assessment schemes are made known to students after the exam by the lecturers to assure the assessment fairness.

School internship advisors and company internship supervisors evaluate the student performance based on criteria in the internship evaluation forms. Evaluation forms for capstone & thesis advisors, thesis reviewers and thesis committee are used to assess student's capstone and thesis performance.

7.4 Feedback of student assessment is timely and help to improve learning

Student academic performance of each semester is recorded in Edusoft and accessible to student advisors. Thus, the advisors monitor their student progress through Edusoft and schedule a meeting to discuss any problems faced by the students that may influence their academic performances.

For a specific course, results of course examination are given to the students no later than 2 weeks after the exam. Besides summative assessment such as midterm and final exams, formative assessments (or process assessment) are also used to give students timely feedback to improve their performance toward the final exam. The process assessment can take up to 40% weight of the whole course assessment and can be in many forms such as games, quizzes, homework and assignments.

For thesis guidance, students are required to meet the advisors regularly. Besides, students also receive the feedback from the school committee in three milestones of the thesis process, i.e. thesis proposal defense, thesis midway and thesis final defense. This greatly helps the students' work meet the required objective, have proper methodology and attain feasible solutions.

7.5 Students have already access to appeal procedure

If a student is not satisfied with the assessment results, he/she can ask for a re-assessment. The department administrative staff assists students in these academic issues. The lecturer who is in charge of the course has to review the paper again and report the new result to the school. Nevertheless, if a student is still not happy with the new result, they can appeal again. This time, another lecturer will be assigned. Students will be announced if there is any change in their score as well as the reason.

As for the thesis, before presenting in front of the thesis examination committee, a student must

obtain a positive recommendation from his/her thesis advisor and thesis reviewers. If there are disagreements between them, the Chair of Thesis Committee will be consulted to find a solution.

8. Program structure

Program Structure

CURRICULUM STRUCTURE	CREDITS	ECTS	PERCENTAGE
General knowledge	55	87.6	36.18 %
Political education	11	17.4	7.24%
Humanity and Social Science	9	15.0	5.92%
Academic English	10	15.5	6.57%
Physical Training	0	0	
Mathematic, Physic, Chemical	25	39.7	16.45%
Core knowledge	11	18.0	7.24 %
Specialized knowledge	68	113.1	44.74 %
Internship, Capstone and Thesis	18	31.4	11.84 %
TOTAL	152	250.1	100%

Comparison of standard curriculum for Batch 2019 onwards and Batch 2017-2018

CURRICULUM STRUCTURE	Batch 2017-2018		Batch 2019 onwards		Main change
	Crds	ECTS	Crds	ECTS	
General knowledge	50	79.6	55	87.6	
Political education	10	16.2	11	17.4	From 3 courses to 5 courses follow Ministry of Education and Training
Humanity and Social Science	6	10	9	15.0	Introduced new course “Ethics and professional skills for engineers”
Academic English	10	15.5	10	15.5	
Physical Training	0	0	0	0	
Mathematic, Physic, Chemical	24	37.9	25	39.7	Introduced new course “Chemistry Laboratory”
Core knowledge	13	21.2	11	18.0	Removed course “Introduction to Programming -C++/C#, Python”
Specialized knowledge	65	108.1	68	113.1	<ul style="list-style-type: none"> Removed course “Differential Equation” from the Compulsory Knowledge. Moving course “CAD/CAM” from the

					Elective Knowledge to the Compulsory Knowledge and change the course name to “CAD/CAM/CNC”. Introduced new course “Numerical methods” to the Compulsory Knowledge.
Internship, Capstone and Thesis	18	31.4	18	31.4	
TOTAL	146	240.3	152	250.1	

9. Industrial and Systems Engineering Program

9.1 Curriculum for BATCH 2019

**Standard curriculum for students of English entry level 1 (AE1 – TOEFL score > 500)*

Total credits: 152 (Note: Credits of Physical Training 1 and Physical Training 2 are not included in cumulative credits)

Length of study: 4 years

Freshman Year (Year 1)				
Semester 1			Crds	ECTS
1	EN007IU	Writing AE1	2	3.1
2	EN008IU	Listening AE1	2	3.1
3	MA001IU	Calculus 1	4	6.2
4	PH013IU	Physics 1	2	3.1
5	PH014IU	Physics 2	2	3.1
6	PT001IU	Physical Training 1	3	5.0
7	CH012IU	Chemistry Laboratory	1	1.8
8	CH011IU	Chemistry for Engineers	3	5.0
Total credits			19	30.4
Semester 2				
9	EN011IU	Writing AE2	2	3.1
10	EN012IU	Speaking AE2	2	3.1
11	MA003IU	Calculus 2	4	6.2
12	PE008IU	Critical Thinking	3	5.0
13	PT002IU	Physical Training 2	3	5.0
14	IS001IU	Introduction to Industrial Engineering	1	1.8
15	IS054IU	Engineering Drawing	3	5.0
16	PH015IU	Physics 3	3	5.0
Total credits			21	29.2
Summer semester			Crds	ECTS
17	PE015IU	Philosophy of marxism and Leninism	3	5.0
18	PE016IU	Political economics of marxism and leninism	2	3.1

		Total credits	5	8.1
Sophomore Year (Year 2)				
Semester 3			Crds	<i>ECTS</i>
19	MA027IU	Applied Linear Algebra	2	3.1
20	IS019IU	Production Management	3	5.0
21	IS086IU	Introduction to Computing	3	5.0
22	IS004IU	Engineering Probability & Statistics	4	6.2
23	MA023IU	Calculus 3	4	6.2
24	PE017IU	Scientific socialism	2	3.1
25	IS090IU	Engineering Mechanics – Dynamics	2	3.1
		Total credits	20	31.7
Semester 4			Crds	<i>ECTS</i>
26	IS020IU	Engineering Economy	3	5.0
27	IS081IU	Deterministic models in OR	4	6.2
28	IS017IU	Work design & Ergonomics + Lab	4	6.9
29	IS085IU	CAD/CAM/CNC	3	5.0
30	IS034IU	Product Design & Development	3	5.0
31	PE018IU	History of the Communist Party of Vietnam	2	3.1
32	PE019IU	HCM' s thoughts	2	3.1
		Total credits	21	34.3
Summer semester				
33	IS052IU	Internship 1	2	4.0
34		Military Training	0	
		Total credits	2	4.0
Junior Year (Year 3)			Crds	<i>ECTS</i>
Semester 5				
35	IS040IU	Management Information System	3	5.0
36	PE014IU	Environmental Science	3	5.0
37	IS025IU	Quality Management	3	5.0
38	IS026IU	Project Management	3	5.0
39	IS024IU	Probabilistic Models in OR	3	5.0
40	IS089IU	Numerical methods	3	5.0
	IS__IU	ISE Elective Course (choose 1 course below)	3	5.0
41	IS031IU	Experimental Design	3	5.0
42	IS087IU	Manufacturing Processes	3	5.0
43	IS058IU	Time series & forecasting technique	3	5.0
		Total credits	21	35
Semester 6			Crds	<i>ECTS</i>
44	IS079IU	Scientific Writing	2	3.1
45	IS028IU	Simulation Models in IE	4	6.9
46	IS027IU	Scheduling & Sequencing	3	5.0
47	IS041IU	Lean Production	3	5.0
48	IS078IU	Logistics engineering & supply chain design	3	5.0
49	PE020IU	Ethnics and professional skills for engineers	3	5.0

		Total credits	18	30.0
Summer semester			Crds	ECTS
50	IS053IU	Internship 2	3	6.0
		Total credits	3	6.0
Senior Year (Year 4)				
Semester 7			Crds	ECTS
51	IS083IU	Capstone Design	3	5.0
52	IS033IU	Multi-Criteria Decision Making	3	5.0
54	IS032IU	Facility Layout	3	5.0
	IS__IU	Free Elective Course Group 2 (choose 2 courses below)	6	
56	IS080IU	Creative Thinking	3	5.0
57	IS035IU	Systems Engineering	3	5.0
58	IS043IU	Flexible Manufacturing Systems	3	5.0
59	IS045IU	Leadership	3	5.0
60	IS023IU	Inventory Management	3	5.0
61	IS082IU	Retail Management	3	5.0
62	IS067IU	International Transportation & Logistics	3	5.0
63	IS062IU	E-Logistics in Supply Chain Management	3	5.0
55	____IU	Free Elective Course Group 3 (choose 1 course)	3	5.0
		Total credits	18	30.0
Semester 8			Crds	ECTS
64	IS048IU	Thesis research	10	16.4
		Total credits	10	16.4

Selecting one Free-elective course only from the following courses for 7th semester.

No.	Course ID	Course name	Crds	ECTS
1	BA115IU	Introduction to Business Administration	3	5.0
2	BA117IU	Introduction to Micro Economics	3	5.0
3	BA120IU	Business Computing Skills	3	5.0
4	BA123IU	Principles of Management	3	5.0
5	BA119IU	Introduction to Macro Economics	3	5.0
6	BA118IU	Introduction to Psychology	3	5.0
7	BA167IU	Introduction to Vietnamese Legal System	3	5.0
8	BA197IU	Introduction to Sociology	3	5.0
9	IS086IU	Introduction to Computing	3	5.0
10	IT011UN	Functional Programming	3	5.0
11	IS064IU	Entrepreneurship	3	5.0
12	IT007UN	Skills for Communicating Information	3	5.0
13	IT151IU	Statistical Methods	3	5.0
14	BM013IU	Entrepreneurship in Biomedical Engineering	3	5.0

15	<i>BM005IU</i>	<i>Statistics for Health Science</i>	3	5.0
16	<i>BM033IU</i>	<i>Information Technology in the Health Care System</i>	3	5.0
17	<i>ENEE2001IU</i>	<i>Introduction to Environmental Engineering</i>	3	5.0
18	<i>ENEE2008IU</i>	<i>Environmental Ecology</i>	3	5.0
19	<i>BT152IU</i>	<i>Biostatistics</i>	3	5.0
20	<i>CHE2041IU</i>	<i>Mass Transfer Operations</i>	3	5.0
21	<i>MAFE105IU</i>	<i>Financial Economics</i>	3	5.0
22	<i>MAFE215IU</i>	<i>Financial Management</i>	3	5.0
23	<i>MAFE209IU</i>	<i>Financial markets</i>	3	5.0
24	<i>MAFE207IU</i>	<i>Decision Making</i>	3	5.0
25	<i>MAFE314IU</i>	<i>Financial Econometrics</i>	3	5.0
26	<i>MAFE308IU</i>	<i>Financial Risk Management 1</i>	3	5.0
27	<i>MAFE402IU</i>	<i>Portfolio Management</i>	3	5.0
28	<i>PH027IU</i>	<i>Earth Observation and The Environment</i>	3	5.0
29	<i>PH047IU</i>	<i>Navigation Systems</i>	3	5.0
30	<i>PH045IU</i>	<i>Fundamental of Surveying</i>	3	5.0
31	<i>PH046IU</i>	<i>Geographic Information Systems (GIS) and Spatical Analysis</i>	3	5.0
32	<i>CE505IU</i>	<i>Geotechnics</i>	3	5.0
33	<i>CE503IU</i>	<i>Pavement design & Maintenance</i>	3	5.0
34	<i>EE049IU</i>	<i>Introduction to Electrical Engineering</i>	3	5.0

9.2 Curriculum for BATCH 2017

**Standard curriculum for students of English entry level 1 (AE1 – TOEFL score > 500)*

Total credits: 146 (Note: Credits of Physical Training 1 and Physical Training 2 are not included in cumulative credits)

Length of study: 4 years

Freshman Year				
Semester 1			Crds	ECTS
EN007IU	Writing AE1		2	3.1
EN008IU	Listening AE1		2	3.1
MA001IU	Calculus 1		4	6.2
PH013IU	Physics 1		2	3.1
PH014IU	Physics 2		2	3.1
PT001IU	Physical Training 1		3	5.0
CH011IU	Chemistry for Engineers		3	5.0
		Total credits	15	23.6
Semester 2			Crds	ECTS
EN011IU	Writing AE2		2	3.1
EN012IU	Speaking AE2		2	3.1
MA003IU	Calculus 2		4	6.2
PE008IU	Critical Thinking		3	5.0
PT002IU	Physical Training 2		3	5.0
IS001IU	Introduction to Industrial Engineering		1	1.8
IS054IU	Engineering Drawing		3	5.0
PH015IU	Physics 3		3	5.0
		Total credits	18	29.2
Summer semester			Crds	ECTS
PE011IU	Principles of Marxism		5	8.1
		Total credits	5	8.1
Sophomore Year				
Semester 3			Crds	ECTS
MA027IU	Applied Linear Algebra		2	3.1
IS019IU	Production Management		3	5.0
IS076IU	Introduction to Computing-Matlab		3	5.0
IS004IU	Engineering Probability & Statistics		4	6.2
MA023IU	Calculus 3		4	6.2
PE012IU	HCM' s thoughts		2	3.1
IS016IU	Engineering Mechanics – Dynamics		3	5.0
		Total credits	21	33.6

Semester 4		Crds	ECTS
IS077IU	Introduction to Programming – C ⁺⁺ /C [#] , Python	2	3.1
IS020IU	Engineering Economy	3	5.0
IS081IU	Deterministic models in OR	4	6.2
IS017IU	Work design & Ergonomics + Lab	4	6.9
IS034IU	Product Design & Development	3	5.0
PE013IU	Revolutionary Lines of Vietnamese Communist Party	3	5.0
MA029IU	Differential Equation	2	3.1
Total credits		21	34.3
Summer semester			
IS052IU	Internship 1	2	4.0
	Military Training		
Total credits		2	4.0
Junior Year			
Semester 5		Crds	ECTS
IS040IU	Management Information System	3	5.0
PE014IU	Environmental Science	3	5.0
IS025IU	Quality Management	3	5.0
IS026IU	Project Management	3	5.0
IS024IU	Probabilistic Models in OR	3	5.0
IS__IU	ISE Elective Course (choose 1 course below)	3	5.0
IS031IU	Experimental Design	3	5.0
IS018IU	CAD/CAM	3	5.0
IS058IU	Time series & forecasting technique	3	5.0
Total credits		18	30.0
Semester 6			
IS079IU	Scientific Writing	2	3.1
IS028IU	Simulation Models in IE	4	6.9
IS027IU	Scheduling & Sequencing	3	5.0
IS041IU	Lean Production	3	5.0
IS078IU	Logistics engineering & supply chain design	3	5.0
Total credits		15	25.0
Summer semester			
IS053IU	Internship 2	3	6.0
Total credits		3	6.0
Senior Year			
Semester 7		Crds	ECTS

<i>IS083IU</i>	<i>Capstone Design</i>	<i>3</i>	<i>5.0</i>
<i>IS033IU</i>	<i>Multi-Criteria Decision Making</i>	<i>3</i>	<i>5.0</i>
<i>IS032IU</i>	<i>Facility Layout</i>	<i>3</i>	<i>5.0</i>
<i>IS__IU</i>	<i>ISE Elective Course (choose 3 courses below)</i>	<i>9</i>	<i>15.0</i>
<i>IS080IU</i>	<i>Creative Thinking</i>	<i>3</i>	<i>5.0</i>
<i>IS035IU</i>	<i>Systems Engineering</i>	<i>3</i>	<i>5.0</i>
<i>IS043IU</i>	<i>Flexible Manufacturing Systems</i>	<i>3</i>	<i>5.0</i>
<i>IS045IU</i>	<i>Leadership</i>	<i>3</i>	<i>5.0</i>
<i>IS023IU</i>	<i>Inventory Management</i>	<i>3</i>	<i>5.0</i>
<i>IS082IU</i>	<i>Retail Management</i>	<i>3</i>	<i>5.0</i>
<i>IS067IU</i>	<i>International Transportation & Logistics</i>	<i>3</i>	<i>5.0</i>
<i>IS062IU</i>	<i>E-Logistics in Supply Chain Management</i>	<i>3</i>	<i>5.0</i>
	<i>Total credits</i>	<i>18</i>	<i>30.0</i>
<i>Semester 8</i>			
		<i>Crds</i>	<i>ECTS</i>
<i>IS048IU</i>	<i>Thesis research</i>	<i>10</i>	<i>16.4</i>
	<i>Total credits</i>	<i>10</i>	<i>16.4</i>

10. Relation of Program ILOs and Courses

For Batch 2019 onwards:

ILO1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

ILO2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

ILO3: An ability to communicate effectively with a range of audiences

ILO4: An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

ILO5: An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

ILO6: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

ILO7: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

(While each course may relate to all the ILOs at different degrees, only the most significant correlation is shown in the table)

			Program ILOs							
	Course ID	Course Name	1	2	3	4	5	6	7	
General Knowledge	PE015IU	Philosophy of Marx - Lenin			x	x				
	PE016IU	Marxist and Leninist Political Economics			x	x				
	PE017IU	Scientific Socialism			x	x				
	PE018IU	History of Communist Party of Vietnam			x	x				
	PE019IU	Ho Chi Minh's Thoughts			x	x				
	PE008IU	Critical Thinking			x		x		x	
	EN007IU	Writing AE1							x	
	EN008IU	Listening AE1							x	
	EN011IU	Writing AE2							x	
	EN012IU	Speaking AE2							x	
	IS079IU	Scientific Writing							x	
	MA001IU	Calculus 1		x					x	x
	MA003IU	Calculus 2		x					x	x
	MA023IU	Calculus 3		x					x	x
	PH013IU	Physics 1		x					x	x
	PH014IU	Physics 2		x					x	x
	PH015IU	Physics 3		x					x	x
MA027IU	Applied Linear Algebra		x					x	x	

	CH011IU	Chemistry for Engineers	x						x	x	
	CH012IU	Chemistry Laboratory	x						x	x	
	PE020IU	Ethics and Professional skills for Engineering			x	x	x				
	PE014IU	Environmental Science	x	x		x	x	x	x	x	
Core knowledge	IS001IU	Introduction to Industrial Engineering			x			x		x	
	IS086IU	Introduction to Computing - Matlab	x	x					x		
	IS004IU	Engineering Probability & Statistics	x						x		
	IS020IU	Engineering Economy		x			x		x		
Specialized Knowledge (Compulsory)	IS019IU	Production management		x			x		x		
	IS081IU	Deterministic models in Operations Research	x	x					x		
	IS090IU	Engineering Mechanics – Dynamics	x	x	x	x	x	x	x		
	IS017IU	Work design & Ergonomics + Lab	x	x					x		
	IS085IU	CAD/CAM/CNC	x				x		x		
	IS034IU	Product Design & Development	x	x	x	x	x	x	x		
	IS040IU	Management Information System	x	x	x	x	x	x	x		
	IS032IU	Facility Layout	x	x	x	x	x	x	x		
	IS025IU	Quality Management	x	x	x	x			x	x	
	IS026IU	Project Management		x			x		x		
	IS078IU	Logistics Engineering & Supply chain Design	x	x	x	x	x	x	x	x	
	IS024IU	Probabilistic Models in Operations Research	x						x		
	IS028IU	Simulation Models in Industrial Engineering	x	x	x			x	x		
	IS027IU	Scheduling & Sequencing	x						x		
	IS041IU	Lean Production	x	x	x	x	x	x	x	x	
	IS054IU	Engineering Drawing	x	x			x		x		
	IS089IU	Numerical Methods	x	x	x	x	x	x	x		
	IS033IU	Multi-Criteria Decision Making	x	x					x		
	Specialized Knowledge (Elective)	IS062IU	E-Logistics in Supply Chain Management	x	x	x	x	x	x	x	x
		IS058IU	Time Series & Forecasting Techniques	x						x	x
IS035IU		Systems Engineering	x	x	x	x	x	x	x		
IS045IU		Leadership	x	x	x	x	x	x	x	x	
IS023IU		Inventory Management	x	x	x	x	x	x	x	x	
IS082IU		Retail Management		x			x	x		x	
IS031IU		Experimental Design							x		
IS087IU		Manufacturing Processes	x				x		x		
IS043IU		Flexible Manufacturing Systems	x				x		x		
IS067IU		International Transportation & Logistics	x	x				x	x		
IS080IU		Creative Thinking	x				x	x		x	
Internship, Capstone and Thesis		IS052IU	Internship 1	x				x		x	x
	IS053IU	Internship 2	x	x				x	x	x	
	IS083IU	Capstone Design	x	x	x	x	x	x	x	x	
	IS048IU	Thesis research	x	x	x	x	x	x	x	x	

ILOs - ASIIN Criteria Mapping

Map 7 ILOs of ISE with ASIIN student learning outcomes

(While each course may relate to all the ILOs at different degrees, only the most significant correlation is shown in the table)

	Course ID	Course name	1.1a	1.1b	1.1c	1.2a	1.2b	1.3a	1.3b	1.3c	1.3d	2.1a	2.1b	2.2a	2.2b	2.3a	2.4a	2.4b	2.4c	2.5a	2.5b	2.6a	2.6b	
General Knowledge	PE015IU	Philosophy Marx - Lenin		x						x											x		x	
	PE018IU	History of Vietnamese Communist Party		x						x											x		x	
	PE016IU	Marxist - Leninist Political Economics		x						x											x		x	
	PE017IU	Scientific Socialism		x						x											x		x	
	PE019IU	Ho Chi Minh's Thoughts		x						x											x		x	
	PE008IU	Critical Thinking		x	x				x	x											x	x	x	
	EN007IU	Writing AE1			x				x														x	
	EN008IU	Listening AE1			x				x														x	
	EN011IU	Writing AE2			x				x														x	
	EN012IU	Speaking AE2			x				x														x	
	IS079IU	Scientific Writing		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	MA001IU	Calculus 1			x	x	x	x			x	x	x	x									x	
	MA003IU	Calculus 2			x	x	x	x			x	x	x	x									x	
	MA023IU	Calculus 3			x	x	x	x			x	x	x	x									x	
	PH013IU	Physics 1			x	x	x	x			x	x	x	x									x	
	PH014IU	Physics 2			x	x	x	x			x	x	x	x									x	
	PH015IU	Physics 3			x	x	x	x			x	x	x	x									x	
	MA027IU	Applied Linear Algebra	x	x	x	x	x	x			x	x	x	x			x			x			x	

	CH011IU	Chemistry for Engineers				x	x					x	x	x	x	x			x		x			
	CH012IU	Chemistry Laboratory				x						x				x			x		x			
	PE020IU	Ethnics and Professional skills for Engineering		x		x	x			x	x	x	x				x	x		x	x			x
	PE014IU	Environmental Science	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x		x
Core knowledge	IS001IU	Introduction to Industrial Engineering			x				x							x								
	IS086IU	Introduction to Computing										x		x										
	IS004IU	Engineering Probability & Statistics				x	x					x	x	x	x	x			x		x			
	IS020IU	Engineering Economy	x	x			x	x	x						x			x						x
Specialized Knowledge (Compulsory)	IS019IU	Production management		x		x	x					x											x	
	IS081IU	Deterministic models in Operations Research				x	x			x	x	x	x	x	x		x	x					x	
	IS090IU	Engineering Mechanics – Dynamics											x		x								x	
	IS017IU	Work design & Ergonomics + Lab	x				x		x														x	
	IS085IU	CAD/CAM/CNC	x			x	x																x	x
	IS034IU	Product Design & Development					x		x				x		x								x	
	IS040IU	Management Information System	x				x		x														x	
	IS032IU	Facility Layout											x		x								x	
	IS025IU	Quality Management		x			x			x	x													
	IS026IU	Project Management		x		x	x						x										x	

	IS078IU	Logistics Engineering & Supply chain Design	x	x	x	x	x	x	x	x	x	x	x	x			x		x	x	x	x	x
	IS024IU	Probabilistic Models in Operations Reseach																					
	IS028IU	Simulation Models in Industrial Engineering			x	x	x	x		x	x	x	x	x	x		x	x		x		x	
	IS027IU	Scheduling & Sequencing				x	x				x	x	x	x	x			x		x			
	IS041IU	Lean Production	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	IS054IU	Engineering Drawing	x			x	x														x		
	IS089IU	Numerical Methods										x		x						x			
	IS033IU	Multi-criteria Decision Making				x	x			x	x	x	x	x	x		x	x		x			
Specialized Knowledge (Elective)	IS062IU	E-Logistics in Supply Chain Management	x	x	x	x	x	x	x		x	x	x	x	x		x	x		x	x	x	x
	IS058IU	Time Series & Forecasting Techniques	x											x				x					
	IS035IU	Systems Engineering					x					x		x						x			
	IS045IU	Leadership	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	IS023IU	Inventory Management	x	x	x	x	x	x	x	x	x	x	x	x	x		x		x	x	x	x	x
	IS082IU	Retail Management		x				x	x													x	
	IS031IU	Experimental Design				x					x				x			x		x			
	IS087IU	Manufacturing Processes	x				x														x		
	IS043IU	Flexible Manufacturing Systems	x				x														x		
	IS067IU	International Transportation & Logistics		x	x	x	x		x	x	x	x	x	x	x		x	x		x		x	

	IS080IU	Creative Thinking		x	x	x	x		x	x	x	x	x	x							x	x	x
Internship, Capstone and Thesis	IS052IU	Internship 1		x	x	x																	
	IS053IU	Internship 2		x	x	x																	
	IS083IU	Capstone Design			x	x	x	x	x	x	x	x	x	x	x		x			x	x	x	x
	IS048IU	Thesis research	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x

For Batch 2017-2018:

- a. An ability to apply knowledge of mathematics, science and engineering
- b. An ability to design and conduct experiments, as well as to analyze and interpret data
- c. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- d. An ability to function in multidisciplinary teams
- e. An ability to identify, formulate, model and simulate and solve engineering problems
- f. An understanding of professional and ethical responsibility
- g. An ability to communicate effectively
- h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- i. A recognition of the need for, and an ability to engage in life-long learning
- j. A knowledge of contemporary issues and ability to self-update
- k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

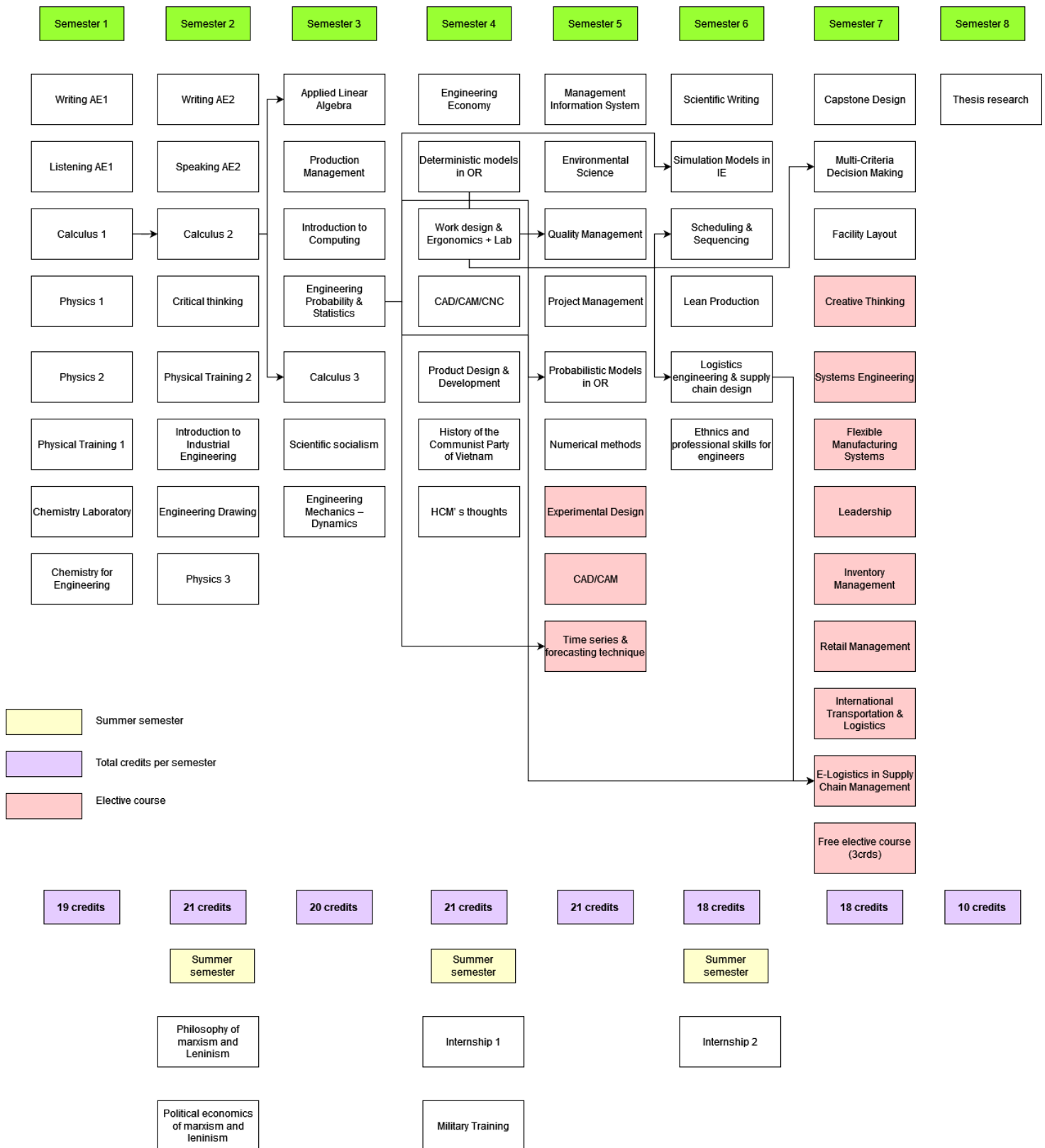
(While each course may relate to all the ELOs at different degrees, only the most significant correlation is shown in the table)

			Program ELOs										
	Course ID	Course name	a	b	c	d	e	f	g	h	i	j	k
General Knowledge	PE011IU	Principles of Marxism			x	x		x			x		
	PE012IU	HCM' s thoughts			x	x		x			x		
	PE013IU	Revolutionary Lines of Vietnamese Communist Party			x	x		x			x		
	PE008IU	Critical Thinking				x			x		x		
	EN007IU	Writing AE1									x		
	EN008IU	Listening AE1									x		
	EN011IU	Writing AE2									x		
	EN012IU	Speaking AE2									x		
	IS079IU	Scientific Writing									x		
	MA001IU	Calculus 1	x	x			x				x		
	MA003IU	Calculus 2	x	x			x				x		
	MA023IU	Calculus 3	x	x			x				x		
	PH013IU	Physics 1	x	x			x				x		
	PH014IU	Physics 2	x	x			x				x		
	PH015IU	Physics 3	x	x			x				x		
	MA027IU	Applied Linear Algebra	x	x			x				x		

	CH011IU	Chemistry for Engineers	x	x			x				x			
	PE014IU	Environmental Science									x			
Core knowledge	IS001IU	Introduction to Industrial Engineering				x			x					
	IS076IU	Introduction to Computing - Matlab					x						x	
	IS077IU	Introduction to Programming - C++/C#,Python	x	x			x						x	
	IS004IU	Engineering Probability & Statistics	x	x			x							
	IS020IU	Engineering Economy	x				x			x	x		x	
		IS019IU	Production management	x							x	x	x	x
Specialized Knowledge (Compulsory)	IS081IU	Deterministic models in Operations Research	x				x						x	
	IS016IU	Engineering Mechanics – Dynamics	x				x						x	
	IS017IU	Work design & Ergonomics + Lab		x			x						x	
	IS034IU	Product Design & Development		x	x		x	x	x				x	x
	IS040IU	Management Information System			x								x	x
	IS032IU	Facility Layout	x		x		x						x	x
	IS025IU	Quality Management	x		x	x				x	x			
	IS026IU	Project Management				x			x		x			x
	IS078IU	Logistics Engineering & Supply chain Design	x		x		x							x
	IS024IU	Probabilistic Models in Operations Research	x				x							x
	IS028IU	Simulation Models in Industrial Engineering	x	x	x		x						x	x
	IS027IU	Scheduling & Sequencing	x		x		x						x	x
	IS041IU	Lean Production	x		x		x	x						x
	IS054IU	Engineering Drawing			x									x
	MA029IU	Differential Equation	x	x			x					x		
	IS033IU	Multi-criteria Decision Making	x				x							x
	Specialized Knowledge (Elective)	IS062IU	E-Logistics in Supply Chain Management											x
IS058IU		Time Series & Forecasting Techniques	x											
IS035IU		Systems Engineering									x			
IS045IU		Leadership						x	x			x		
IS023IU		Inventory Management	x		x		x						x	
IS082IU		Retail Management	x					x	x	x				
IS031IU		Experimental Design	x	x	x									x
IS018IU		CAD/CAM	x		x									x
IS043IU		Flexible Manufacturing Systems	x		x		x				x			x
IS067IU		International Transportation & Logistics	x		x		x				x			x
IS080IU		Creative Thinking				x	x	x	x			x	x	
Internship, Capstone and Thesis	IS052IU	Internship 1						x	x				x	
	IS053IU	Internship 2				x	x	x	x	x	x	x	x	x
	IS083IU	Capstone Design	x	x	x	x	x	x	x	x	x	x	x	x
	IS048IU	Thesis research	x	x	x	x	x	x	x	x	x	x	x	x

11. Curriculum Mapping

(Standard curriculum for students of English entrance level 1)



tools and methods for product design and development. Highlight of the course is the project in which the students will design a new product and produce a prototype version of it. Throughout the project, the students will apply their learned principles and methods of product development in a realistic context. The course also enables the students to coordinate interdisciplinary tasks in order to achieve a common objective.

IS040IU Management Information System 3 credits

Integrates topics of management and organization theory, information and communication theory, and systems theory relevant to managing an organization's information resources.

Includes computer hardware and software, telecommunications, and database concepts and emphasizes the e-commerce and Internet based business models to get a competitiveness of global based business environments. This course meets the requirements for a Technology Intensive course.

IS032IU Facility Layout 3 credits

This course focuses on the fundamentals of the design, layout, and location of industrial and nonmanufacturing facilities. Selection of machines and material handling equipment and their efficient arrangement. Emphasis on quantitative methods. Warehouse layout. Facility location theory

IS025IU Quality Management 3 credits

This course introduces the principles of quality management, with an emphasis on cross-functional problem solving. It provides methods for quality planning, improvement and control with applications in manufacturing and service. The students also gain a basic understanding of the philosophy, conceptual frameworks and the tools of Total Quality Management.

IS026IU Project Management 3 credits

Project management" course is developed to provide the principal concept on project management which was characterized by the project management body of knowledge guide (PMBOK Guide). The course emphasizes the five project process groups of initiating, planning, executing, controlling and closing, and the nine knowledge areas of project integration, scope, time, cost, quality, human resources, communication, risk, and procurement management.

In addition, this course also provides computer aid for project management by introducing the application of Microsoft Project and project scheduling.

IS078IU Logistics Engineering & Supply chain Design 3 credits

Logistics and Supply chain management involves a number of decisions that benefit by quantitative techniques of analysis and design. The course will explore modeling, computation implementation of solutions in some areas of Logistics and Supply Chain Management. The content also includes material flow management across the supply chain, value management and analysis of total supply chain costs, robust design of supply chains, coordination of supply chain decisions and handling of uncertainties in supply chain management.

IS024IU Probabilistic Models in Operations Research 3 credits

To introduce the student into basic topics of mathematical modeling process of decision problems in complex stochastic industrial environments. This course covers stochastic operations research models, algorithms, and applications. Markov chains and queuing models are discussed. Renewal theory, reliability theory, and stochastic models for manufacturing systems are also taken into consideration. Students will acquire in this course the basis for the study of other probabilistic topics in their curriculum.

IS028IU Simulation Models in Industrial Engineering 4 credits

Systems modeling and simulation techniques find applications in fields as diverse as physics, chemistry, biology, economics, medicine, computer science, and engineering. The purpose of this course is to introduce fundamental principles and concepts in the general area of systems modeling and simulation. Topics to be covered in this course include basics of discrete-event system simulation, mathematical and statistical models.

IS027IU Scheduling & Sequencing 3 credits

This course gives an introduction to scheduling problems: techniques, principles, algorithms and computerized scheduling systems. Topics include scheduling algorithms for single machine, parallel machine, flow shop, job shop and also solution methodologies such as heuristic procedures, constructive algorithms, branch and bound approaches, and genetic algorithms.

IS041IU Lean Production 3 credits

This course will help students to understand the concepts and philosophies of lean, get familiar with lean tools/techniques, especially the concepts behind the tools/techniques used, and develop analytical, problem solving skills. Therefore, the students will be able to join well in most of foreign-invested enterprises or large organizations in Vietnam after graduation. Ultimately, they will be able to apply lean philosophy creatively in each unique practical situation.

IS054IU Engineering Drawing 3 credits

This course provides students skills to present and interpret spatial models on planar models, and present engineering drawings according to international standards (ISO). Methods of presenting models: orthogonal projection, isometric projection, oblique projection... Apply the projections to present objects in the drawings.

IS089IU Numerical Methods 3 credits

Students learn numerical methods: Error analysis, matrices, system of linear equations, approximation theory, numerical solution of nonlinear systems of equations, interpolation, numerical differentiation and integration, numerical solution of differential equations.

IS033IU Multi-Criteria Decision Making 3 credits

Decision making is one of the important parts in operation research or management science. Decision making techniques help management to choose the best alternative based on quantitative criteria. This

course provides students with basic knowledge about decision model formulation, so that they can make decisions based on the results of the models. This course also provides students with specific techniques for practical applications in production and services.

IS062IU E-Logistics in Supply Chain Management 3 credits

Comprehensive inquiry into the role of e-commerce in collaborative distribution and logistics relationships. Special attention is afforded to resource and technology interdependencies, exchange governance mechanisms and relationship management bench-marking. Emphasis is given to the tools for creating value in the supply chain.

IS058IU Time Series & Forecasting Techniques 3 credits

The simplest definition of economic forecasting is that it is a process that has as its objective the prediction of future events or conditions to reduce that uncertainty so that our decisions will be better ones.

Specific objectives are to instruct you in:

1. The formulation and specification of forecasting models;
2. Data collection, interpretation, organization, and analysis for building forecasting models;
3. Fundamental statistical and probability concepts used in forecasting;
4. The existence of a hierarchy of forecasting models;
5. The use of econometric software in a lab setting.

IS035IU Systems Engineering 3 credits

Systems Science is the course of methods to develop and analyze the systems. This course provides the knowledge and skills necessary for the engineers in the development process and systems analysis (manufacturing and services): systems engineering processes, methods of evaluation, selection and integration of system components, system simulation, and assessment of reliability, availability, and serviceability of the systems.

IS045IU Leadership 3 credits

Organizational development and learning; leading learning organizations; leadership theories and perspectives, followership, leadership development; coaching and mentoring; leading groups and teams, leadership and diversity.

IS023IU Inventory Management 3 credits

Every organization holds stocks of materials to allow for variations and uncertainty in supply and demand. Stocks are replenished by deliveries from suppliers and reduced to meet demands from customers. Inventory management is responsible for all aspects of stock control. High stock buffer comes at a high price and organizations are continually looking for ways of reducing their inventory costs without affecting service.

13. Academic Regulation

Summer Internship Registration

Students are allowed to register for summer internship before the academic year when they aim to apply for a thesis.

❖ Objectives:

- To develop skills in the application of theory to practical work situations;
- To develop skills and techniques directly applicable to their careers;
- To provide students the opportunity to get involved with industry before graduation.

❖ Internship duration: two internships are requirement

- Internship 1: Minimum 4 weeks
- Internship 2: minimum 8 weeks to 12 weeks (full-time working)

Thesis Registration

❖ Criteria:

- Successfully accumulate at least 95% of total required credits (not including 10 credits of the thesis course)
- Do not under any academic admonishment.

❖ Duration: minimum 12 weeks

Graduation Criteria

- Students have to complete all of the following requirements for graduation:
- Successfully complete the academic curriculum (143 credits) with GPA ≥ 50
- Meet the minimum English requirement of 61 TOEFL iBT, 6.0 IELTS.
- Military Education Certification
- Meet other requirements in accordance with the regulations for graduation set by the IU.

Scholarship Information

❖ University Scholarship (Decision No. 99 & 100/ĐHQT-ĐT)

Each semester, top 10% of students with highest GPA will receive scholarship from the IU. 4% of students will receive full scholarship (12.000.000 VND for Fall/Spring semester or 6.000.000 VND for summer semester) and 6% of students will receive half scholarship (6.000.000 VND for Fall/Spring semester or 3.000.000 for summer semester).

- **Minimum requirements:**

- Complete the Academic English 1 (AE1)
- Register at least 12 credits for Fall/Spring semester or 6 credits for Summer semester;
- Semester GPA ≥ 70 (with no course fails in that semester)

❖ **Admission Scholarship 2012**

- **Full scholarship** (full tuition exemption for 4 years – equivalent to 120.000.000 VND):
Students have entrance examination scores ≥ 24 .
- **Partial scholarship** (half tuition exemption for 4 years – equivalent to 60.000.000 VND):
Students have entrance examination scores ≥ 23 .
- **Condition to maintain Scholarships:** Students must have GPA each semester ≥ 70 and the score of every subject ≥ 50 .

Course Registration

Course registration aims at helping students gain full success in building their own training plan, selecting appropriate subjects for every semester in such a way that can meet his or her own personal capacity and conditions for the highest achievement.

- Students should register a minimum of 12 credits, except for the last semester.
- Students should register a maximum of 24 credits in one semester, except for the last semester, for those who have cumulative GPA ≥ 65
- The subject registration form must be approved by the academic advisors.
- For exceptional cases, students must file for the consideration of the Dean of Schools.
- Students do online course registration on the website: <https://hcmiu.edu.vn/edusoftweb/> (username and password for student will be created by the university).
- The registration time will be informed at the School of Industrial Engineering and Management.

Adjusting Student Timetable

When receiving the timetables, students must check the information including the number of registered courses, tuition fees, etc... If there should be any errors, students must report to the Department within three days of the timetable announcement.

The Schools must check (through the academic advisors) and give their opinions on the students' file of documents, and then send them to the Office of Undergraduate Academic Affairs for settlement.

Adding and Dropping Courses

In the first week of teaching, based on their timetables, ability and learning conditions, students can

file for adding and dropping courses.

Academic Probation

The University Academic Committee will consider to settle the academic matters after the first and summer semester annually. The result of the summer semester will be added to that of the second semester of the corresponding year upon academic settling.

Student violating the below regulation will be admonished academically:

- Those who acquire insufficient credits as required by the specialization in one semester;
- Cumulative GPA < 35
- Having two consecutive cumulative GPA < 50

The duration for academic probation will last in the succeeding formal semester.

Academic suspension

Students violating one of the below regulation will be suspended academically:

- The ultimate time for studying has finished;
- To drop out of university more than one semester without approval of IU;
- Students are warned more than 2 times;
- Do not register courses for each semester;
- Do not finish tuition fees in the prescribed time.

Academic Information

- Students can see all studying results in each semester and training results at the School of Industrial Engineering and Management.
- In the studying process, students can ask for a student's transcript at the Office of Undergraduate Academic Affairs.
- For students who are warned or suspended, the university will send the information to the student's family.

Grading Criteria

Classification	Scale 0 of 100	Scale 0 of 4	Letter grade
PASS			
Excellent	85 <= GPA <= 100	4.0	A
Very Good	75 <= GPA < 85	3.75	A-

Good	65 <= GPA < 75	3.5	B+
Fairly good	60 <= GPA < 65	3.0	B
Fair	55 <= GPA < 60	2.5	C+
Average	55 <= GPA < 60	2.0	C
FAIL			
Weak	30 <= GPA <= 50	1.3	D+
Rather weak	10 <= GPA <= 30	1.0	D
Too weak	GPA <= 10	0	F



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SPECIFICATION

COURSE SYLLABUS

SYLLABUS OF GENERAL COURSES



**VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY**
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name:
PHILOSOPHY MARX - LENIN

Course Code: **PE015IU**

1. General information

<i>Module designation</i>	The course equips students with basic knowledge of Marxist-Leninist philosophy.
<i>Semester(s) in which the module is taught</i>	Summer Semester (1 st year)
<i>Person responsible for the module</i>	Lecturers at School of Political and Administration Sciences, VNU-HCM
<i>Language</i>	<i>Vietnamese</i>
<i>Relation to curriculum</i>	<i>Compulsory</i>
<i>Teaching methods</i>	<i>Lecture, group discussion, presentation</i>
<i>Workload (incl. contact hours, self-study hours)</i>	<i>(Estimated) Total workload: 137.5</i> <i>Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5</i> <i>Private study including examination preparation, specified in hours¹: 100</i>
<i>Credit points</i>	<i>03 (5.0 ECTS)</i>
<i>Required and recommended prerequisites</i>	<i>None</i>
<i>Module objectives</i>	<ul style="list-style-type: none">- The course equips students with the basic contents of the worldview and the Marxist-Leninist philosophical methodology.- Help students to apply knowledge about worldview, Marxist-Leninist philosophical methodology creatively in cognitive and practical activities, in order to solve problems of social life of country and time.

¹ When calculating contact time, each contact hour is counted as a full hour. Because of the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<p><i>Tentative learning outcomes</i></p>	<p>I. Knowledge</p> <ol style="list-style-type: none"> 1. Philosophy and its role in social life <ol style="list-style-type: none"> 1.1. Conceptualize philosophy and some basic concepts 1.2. Recognize the opposition between materialism and idealism in solving the fundamental problem of philosophy 1.3. Understanding dialectical materialism - the highest developed form of it 1.4. Understand the birth, objects, functions and roles of Marxist-Leninist philosophy 2. Dialectical materialism <ol style="list-style-type: none"> 2.1. Understanding matter from the point of view of dialectical materialism 2.2. Understanding consciousness from the point of view of dialectical materialism 2.3. Resolving the relationship between matter and consciousness from the point of view of dialectical materialism 2.4. Understand dialectics and materialistic dialectics 2.5. Understand the two basic principles of materialist dialectic and derive the methodological significance of each 2.6. Understand the pairs of basic categories of the material dialectic and derive the methodological meaning of each pair of categories 2.7. Understand the fundamental rules of the materialist dialectic and derive the methodological meaning of each one 2.8. Understand practice, perception, the role of practice in perception and truth 3. Historical materialism <ol style="list-style-type: none"> 3.1. Understand the role of production and its methods in the existence and development of society 3.2. Understand the dialectical relationship between forces of production and relations of production 3.3. Understand the dialectical relationship between infrastructure and market economy; the natural development of socio-economic forms 3.4. Understand class, class struggle; ethnicity and the relationship among class, nation and humanity 3.5. Understanding the state and social networks 3.6. Understand the dialectical relationship between social existence and social consciousness 3.7. Understand the nature of human being; the phenomenon of alienation and liberation of man from the relationship between the individual and society, and from the role of the masses.
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	<p>II. Skills Demonstrate the ability to generalize, think, debate, critique, and groupwork</p> <ol style="list-style-type: none"> 1. Have the skill of generalizing to pick out keywords for each content and think systematically 2. Have skills in presenting, explaining, criticizing, debating and eloquent about theories being studied and researched based on practice 3. Have skills in social communication, cooperation and teamwork, sharing knowledge and experience, ability to run a group <p>III. Attitudes Express consciousness and awareness during and after learning</p> <ol style="list-style-type: none"> 1. Have a sense of responsibility to protect the science, revolution and humanity of Marxism-Leninism 2. Have a sense of personal responsibility towards the community 3. Have awareness of the need for lifelong learning and research and applying practically. 															
<p><i>Content</i></p>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: period (1 period = 50 minutes) Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Introduction</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Philosophy and its role in social life</td> <td>15</td> <td>T, U</td> </tr> <tr> <td>Dialectical materialism</td> <td>15</td> <td>T, U</td> </tr> <tr> <td>Historical materialism</td> <td>14</td> <td>T, U</td> </tr> </tbody> </table>	Topic	Weight	Level	Introduction	1	I, T	Philosophy and its role in social life	15	T, U	Dialectical materialism	15	T, U	Historical materialism	14	T, U
Topic	Weight	Level														
Introduction	1	I, T														
Philosophy and its role in social life	15	T, U														
Dialectical materialism	15	T, U														
Historical materialism	14	T, U														
<p><i>Examination forms</i></p>	<p>Class discussion; Group presentations and reports; Mid-term exam: essay (opened-book); Final exam: essay (closed-book)</p>															
<p><i>Study and examination regulations</i></p>	<ol style="list-style-type: none"> 1. Regulations for group presentations <ul style="list-style-type: none"> - Forming a group: 5 students/group. The deadline for group topic registration on the forum is session 2 or directly submit it to the lecturer at the exam. - Week 4 (4th session) begin to present in order. Note that the presenting groups need to fully show up and bring along all relevant documents. - Submission form: submit files and minutes of group work via email to the lecturer 2. Regulations on time, attendance and discipline in the course: attend class on time and at least 80% of the sessions (only to be absent for a maximum of 20%). Exam ban is applied to those who miss more than the regulated number of sessions. Students must have all test scores, lively discussions, constructive and serious statements in class. 															

<i>Materials</i>	<p>1. Ministry of Education and Training (2019), <i>Giáo trình Triết học Mác - Lênin</i>, National Political Publishing House, Hanoi.</p> <p>2. Ministry of Education and Training (2012), <i>Giáo trình Những Nguyên lý cơ bản của chủ nghĩa Mác - Lênin</i>, National Political Publishing House, Hanoi.</p> <p>3. Governing Body (2008), <i>Giáo trình Triết học Mác-Lênin</i>, National Political Publishing House, Hanoi.</p>
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2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	SLO						
	1	2	3	4	5	6	7
1			x				
2			x				
3				x			

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1c		1.3a						2.6a
2	1.1c		1.3a						2.6a
3	1.1b		1.3c					2.5b	2.6b

3. Assessment plan

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

4. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (65%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	35		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (5%)			
	05		
TOTAL SCORE			
	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/hypothesis).	Specific position (perspective, thesis/hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.

	credibility/ authority on the topic.	authority on the topic.	authority on the topic.	
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

5. Date revised: April , 2022

Ho Chi Minh City, 04/2022
Head/Dean of Department/School
(Signature)



COURSE SYLLABUS

Course Name:

MARXIST - LENINIST POLITICAL ECONOMY

Course Code: **PE016IU**

1. General information

<i>Module designation</i>	The program consists of 6 chapters, in which Chapter 1 discusses the Objects, research methods and functions of Marxist-Leninist political economy; the remain chapters present the core content of Marxist-Leninist Political Economy according to the module's objectives. Specifically, the content includes commodities, markets and the role of stakeholders; producing surplus value; competition and monopoly; socialist-oriented market economy and economic interest relations in Vietnam; and industrialization, modernization, and international economic integration in Vietnam.
<i>Semester(s) in which the module is taught</i>	Summer Semester (1 st year)
<i>Lecturer</i>	Lecturers at School of Political and Administration Sciences, VNU-HCM
<i>Language</i>	<i>Vietnamese</i>
<i>Relation to curriculum</i>	<i>Compulsory</i>
<i>Teaching methods</i>	<i>Lecture, group discussion, presentation</i>
<i>Workload (incl. contact hours, self-study hours)</i>	<i>(Estimated) Total workload: 85</i> <i>Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 25</i> <i>Private study including examination preparation, specified in hours²: 60</i>
<i>Credit points</i>	<i>02 (3.1 ECTS)</i>
<i>Required and recommended prerequisites</i>	Marxist-Leninist philosophy

² When calculating contact time, each contact hour is counted as a full hour. Because of the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Module objectives</i>	<p>Firstly, to equip students with fundamental knowledge of Marxist-Leninist political economy in the context of economic development of the country and the world today; to ensure the basic, systematic, scientific, and up-to-date knowledge associated with practice, creativity, skills, thinking, and traits of students, as well as to enhance the interdisciplinary and non-overlapping interoperability, also reduce the amount of academic or outdated material for college and university non-theoretical students.</p> <p>Secondly, on that basis, to form the mindset, skills of analysis, evaluation, and identification of the nature of economic benefit relations in the country's socio-economic development, contributing to helping students build appropriate social responsibility in the job position and life after graduation.</p> <p>Thirdly, to contribute to building the stance and ideology of Marxism-Leninism towards students.</p>
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<p><i>Tentative learning outcomes</i></p>	<p>II. Knowledge</p> <p><i>1. Objects, research methods and functions of Marxist-Leninist political economy</i></p> <p>1.1. Understanding the formation and development of Marxist-Leninist political economy</p> <p>1.2. Identify the research object of Marxist-Leninist political economy</p> <p>1.3. Understand the research method of Marxist-Leninist political economy</p> <p>1.4. Understand the functions of Marxist-Leninist political economy course</p> <p><i>2. Commodities, markets, and the role of stakeholders</i></p> <p>2.1. Understand the definition and the conditions for the production of goods</p> <p>2.2. Understanding the commodity, its two attributes, and the relationship between them</p> <p>2.3. Understand the relationship between the duality of commodity-producing labor and the two attributes of commodities</p> <p>2.4. Understand the quality and quantity of the good's value and the affecting factors</p> <p>2.5. Understand the origin, nature and function of money</p> <p>2.6. Understanding the market, the role of the market, the market mechanism and the market economy</p> <p>2.7. Understand some key patterns of the market economy</p> <p>2.8. Understand the role of stakeholders</p> <p><i>3. Surplus value in a market economy</i></p> <p>3.1. Understand the concept, the general formula and contradiction of capital</p> <p>3.2. Understand what the commodity labor is and why need to study it</p> <p>3.3. Understand what surplus value is</p> <p>3.4. Understanding the nature of capital accumulation</p> <p>3.5. Understand the concepts: production cost, profit, profit margin, average profit, commercial profit, factors affecting profit rate</p> <p>3.6. Understand what income is</p> <p>3.7. Understanding capitalist rents, their types and land prices</p> <p><i>4. Competition and monopoly in the market economy</i></p> <p>4.1. Understand the relationship between competition and monopoly in a market economy</p> <p>4.2. Understand the causes of monopoly formation in the market economy</p> <p>4.3. Understanding the basic economic features of monopoly in capitalism from Lenin's viewpoint</p> <p>4.4. Understand the causes of formation and development of state monopoly capitalism</p> <p>4.5. Understand the nature and the main manifestations of state monopoly in capitalism</p> <p>4.6. Understand the historical role of capitalism</p> <p><i>5. Socialist-oriented market economy and economic interest relations</i></p>
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	<p><i>in Vietnam</i></p> <p>5.1. Understand the concept of a socialist-oriented market economy in Vietnam</p> <p>5.2. Understand the objective necessity of developing a socialist-oriented market economy in Vietnam</p> <p>5.3. Understanding the characteristics of the socialist-oriented market economy in Vietnam</p> <p>5.4. Understand what the socialist-oriented market economy institution is and the need to improve it</p> <p>5.5. Grasp the basic contents of improving the socialist-oriented market economy institution in Vietnam</p> <p>5.6. Understand the concept and the relationship of economic benefits</p> <p>5.7. Understand the role of the state in ensuring the harmonization of relations of interest</p> <p><i>6. Vietnam's industrialization, modernization and international economic integration</i></p> <p>6.1. Understand what the industrial revolution is and be able to generalize the historical revolutions</p> <p>6.2. Understand the role of the industrial revolution for development</p> <p>6.3. Understand the concept and typical models of industrialization in the world</p> <p>6.4. Understand the objective necessity of industrialization and modernization in Vietnam</p> <p>6.5. Understand the contents of industrialization and modernization in Vietnam</p> <p>6.6. Understand industrialization and modernization in Vietnam in the context of the 4.0 industrial revolution.</p> <p>6.7. Understand the concept and the reason why international economic integration an objective necessity</p> <p>6.8. Understand the contents and positive and negative impacts of international economic integration</p> <p>6.9. Grasp the direction of improving the efficiency of international economic integration in Vietnam's development</p>
	<p>II. Skills</p> <p><i>Demonstrate the ability to generalize, think, debate, critique, and groupwork</i></p> <p>1. Have the skill of generalizing to pick out keywords for each content and think systematically</p> <p>2. Have skills in presenting, explaining, criticizing, debating and eloquent about theories being studied and researched based on practice</p> <p>3. Have skills in social communication, cooperation and teamwork, sharing knowledge and experience, ability to run a group</p> <p>III. Attitudes</p> <p><i>Express consciousness and awareness during and after learning</i></p> <p>1. Have a sense of responsibility to protect the science, revolution and humanity of Marxism-Leninism</p> <p>2. Have a sense of personal responsibility towards the community</p> <p>3. Have awareness of the need for lifelong learning and research and applying practically.</p>

<p><i>Content</i></p>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: period (1 period = 50 minutes)</p> <p>Teaching levels: I (introduce); T (teach); U (utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Introduction</td> <td>1</td> <td>I</td> </tr> <tr> <td>Objects, research methods and functions of Marxist-Leninist political economy</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Commodities, markets and the role of stakeholders</td> <td>6</td> <td>T</td> </tr> <tr> <td>Surplus value in a market economy</td> <td>6</td> <td>T, U</td> </tr> <tr> <td>Socialist-oriented market economy and economic interest relations in Vietnam</td> <td>5</td> <td>T, U</td> </tr> <tr> <td>Vietnam's industrialization, modernization and international economic integration</td> <td>5</td> <td>T, U</td> </tr> </tbody> </table>	Topic	Weight	Level	Introduction	1	I	Objects, research methods and functions of Marxist-Leninist political economy	2	I, T	Commodities, markets and the role of stakeholders	6	T	Surplus value in a market economy	6	T, U	Socialist-oriented market economy and economic interest relations in Vietnam	5	T, U	Vietnam's industrialization, modernization and international economic integration	5	T, U
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<p><i>Examination forms</i></p>	<p>Class discussion; Group presentations and reports; Mid-term exam: essay (opened-book); Final exam: essay (closed-book)</p>																					
<p><i>Study and examination regulations</i></p>	<p>1. Regulations for group presentations</p> <ul style="list-style-type: none"> - Forming a group: 5 students/group. The deadline for group topic registration on the forum is session 2 or directly submit it to the lecturer at the exam. - Week 4 (4th session) begin to present in order. Note that the presenting groups need to fully show up and bring along all relevant documents. - Submission form: submit files and minutes of group work via email to the lecturer <p>2. Regulations on time, attendance, and discipline in the course: attend class on time and at least 80% of the sessions (only to be absent for a maximum of 20%). Exam ban is applied to those who miss more than the regulated number of sessions. Students must have all test scores, lively discussions, constructive and serious statements in class.</p>																					
<p><i>Materials</i></p>	<p>1. Mandatory document: Marxist-Leninist political economy textbook for non-specialized undergraduates.</p> <p>2. Referential materials:</p> <ul style="list-style-type: none"> a) Robert, J.R. & Robert, F. H. (2003), <i>History of economic theory and method (in Vietnamese)</i>, Statistical Publishing House. b) Politic Economy Institute, Ho Chi Minh National Academy of Politics (2018), <i>Giáo trình Kinh tế chính trị Mác - Lê nin</i>, Political Theory House. c) K. Marx and F.Engels, Full Volume (vol. 20, 23, 25), National Political Publishing House, 1994. d) V.I. Lenin, Full Volume, Progress Press, Moscow, 1976. e) Davig Begg, Stanley Fisher, Rudiger Dornbusch, <i>Kinh tế học</i>, Hanoi Education Publishing House, 1992. 																					

	<p>f) Communist Party of Vietnam (2016), Document of the 12th National People’s Congress, National Political Publishing House, Hanoi.</p> <p>g) Communist Party of Vietnam (2016), Report summarizing some theoretical and practical problems through thirty years of renovation (1986 - 2016), National Political Publishing House, Hanoi.</p> <p>h) Communist Party of Vietnam (2017), Resolution No. 11-NQ/TW dated June 3, 2017 on: “Improving the socialist-oriented market economy institution”</p> <p>i) Directive No. 16/CT-TTg (2017) “on strengthening access to the 4.0 industrial revolution”.</p> <p>j) Jeremy Rifkin (2014), <i>The third industrial revolution (in Vietnamese)</i>, Labor and Social Publisher Co. Ltd.</p> <p>k) Manfred B. Steger (2011), <i>Globalization - A Very Short Introduction</i>, Knowledge Publishing House.</p> <p>l) Klaus Schwab (2015), <i>The fourth industrial revolution</i>, National Political Publishing House, 2018.</p>
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2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	SLO						
	1	2	3	4	5	6	7
1			x				
2			x				
3				x			

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

ASIN learning outcomes									
CLO	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1c		1.3a						2.6a
2	1.1c		1.3a						2.6a
3	1.1b		1.3c					2.5b	2.6b

3. Assessment plan

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

4. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:		HW/Assignment:	
Date:		Evaluator:	
	Max.	Score	Comments
Technical content (65%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	35		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (5%)			
	05		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	monstrates complete understanding of the problem. All requirements of task are included in response
4	monstrates considerable understanding of the problem. All requirements of task are included.
3	monstrates partial understanding of the problem. Most requirements of task are included.
2	monstrates little understanding of the problem. Many requirements of task are missing.
1	monstrates no understanding of the problem.
0	response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1

Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

5. Date revised: April , 2022

Ho Chi Minh City, 04/2022
Head/Dean of Department/School
(Signature)



**VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY**
School of Industrial Engineering and Management

COURSE SYLLABUS
Course Name:
SCIENTIFIC SOCIALISM

Course Code: **PE017IU**

1. General information

<i>Module designation</i>	The course equips students with basic knowledge of scientific socialism.
<i>Semester(s) in which the module is taught</i>	Semester 1 (2 nd year)
<i>Person responsible for the module</i>	Lecturers at School of Political and Administration Sciences, VNU-HCM
<i>Language</i>	<i>Vietnamese</i>
<i>Relation to curriculum</i>	<i>Compulsory</i>
<i>Teaching methods</i>	<i>Lecture, group discussion, presentation</i>
<i>Workload (incl. contact hours, self-study hours)</i>	<i>(Estimated) Total workload: 85</i> <i>Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 25</i> <i>Private study including examination preparation, specified in hours³: 60</i>
<i>Credit points</i>	<i>02 (3.1 ECTS)</i>
<i>Required and recommended prerequisites</i>	1. Marxist-Leninist political economy 2. Marxist-Leninist philosophy
<i>Module objectives</i>	- The subject equips students with the basic contents of scientific socialism (one of the three constituent parts of Marxism-Leninism). - Help students to apply knowledge about scientific socialism creatively in cognitive and practical activities, in order to solve problems of social life of country and time.

³ When calculating contact time, each contact hour is counted as a full hour. Because of the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

Tentative learning outcomes

III. Knowledge

1. Introduction to Scientific Socialism

- 1.1. Generalize the birth of Scientific Socialism, the historical background and the role of Karl Marx and Friedrich Engels
- 1.2. Recognize the basic development stages of Scientific Socialism shown in the works
- 1.3. Understand the object, method and significance of the study of Scientific Socialism

2. The historical mission of the working class

- 2.1. Understand the concept of the working class and its characteristics
- 2.2. Understand the content and characteristics of the historical mission of the working class
- 2.3. Explain the conditions that determine the historical mission of the working class
- 2.4. Analyze the similarities and differences of the working class and the implementation of the mission of the them in the world today
- 2.5. Understand the basic characteristics of the Vietnamese working class and the content of the historical mission of them today
- 2.6. Present the direction and some key solutions to build the working class in Vietnam today

3. Socialism and the transition to socialism

- 3.1. Understanding Socialism is the first stage of the socialist-economic form of communism
- 3.2. Describe the basic features of socialism
- 3.3. Explain the objective necessity of the transition to socialism and the basic features of it
- 3.4. Understand the characteristics of the transition period and socialism in Vietnam, present the directions to build socialism in Vietnam today

4. Democracy and the socialist state

- 4.1. Explain the concept of democracy and the birth and development of democracy in the history of human society
- 4.2. Understand the birth process and nature of socialist democracy
- 4.3. Understand the birth, nature and function of the socialist state as well as the relationship between democracy and the state
- 4.4. Understand the birth, development and nature of socialist democracy in Vietnam
- 4.5. Present the basic characteristics and solutions to build a legal socialist state in Vietnam today

5. Social structure - classes and alliances of classes and classes in the transition to socialism

- 5.1. Present the concept of social structure - generalization and the change of class social structure during the transition to socialism
- 5.2. Explain the inevitability of class alliances during the transition to socialism
- 5.3. Understand the social-class structure in Vietnam during the transitional period and present basic solutions to build and develop class alliances and social classes in Vietnam

6. Ethnic and religious issues in the transition to socialism

- 6.1. Understand the basic concepts and characteristics of the nation and the Marxist-Leninist point of view on the national issue
- 6.2. Present the basic characteristics of the nation in Vietnam and the viewpoints on ethnic policies of the Party and State of Vietnam.
- 6.3. Understanding the nature, origin, features of religion and basic principles of solving religious problems in the transition to socialism
- 6.4. Explain the characteristics of religion in Vietnam and the policies of the Party and State of Vietnam towards religious beliefs today
- 6.5. Understand the characteristics of ethnic and religious relations in

	<p>Vietnam and present basic orientations to solve the relationship between ethnicity and religion in Vietnam today</p> <p>7. Family problems in the transition to socialism</p> <p>7.1. Outline the position, function and role of the family in society</p> <p>7.2. Identify the bases for building a family during the transition to socialism</p> <p>7.3. Explain the change of the Vietnamese family and present the basic directions for building and developing the Vietnamese family during the transition to socialism</p>																											
	<p>II. Skills</p> <p><i>Demonstrate the ability to generalize, think, debate, critique, and groupwork</i></p> <p>1. Have the skill of generalizing to pick out keywords for each content and think systematically</p> <p>2. Have skills in presenting, explaining, criticizing, debating and eloquent about theories being studied and researched based on practice</p> <p>3. Have skills in social communication, cooperation and teamwork, sharing knowledge and experience, ability to run a group</p> <p>III. Attitudes</p> <p><i>Express consciousness and awareness during and after learning</i></p> <p>1. Have a sense of responsibility to protect the scientific and revolutionary nature of Marxist-Leninist theories on socialism and the transition to socialism in Vietnam</p> <p>2. Have a sense of personal responsibility towards the community</p> <p>3. Have awareness of the need for lifelong learning and research and applying practically</p>																											
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<i>Examination forms</i>	Class discussion; Group presentations and reports; Practices; Mid-term exam; Final exam																											

<p><i>Study and examination regulations</i></p>	<p>1. Regulations for group presentations</p> <ul style="list-style-type: none"> - Forming a group: 5 students/group. The deadline for group topic registration on the forum is session 2 or directly submit it to the lecturer at the exam. - Week 4 (4th session) begin to present in order. Note that the presenting groups need to fully show up and bring along all relevant documents. - Submission form: submit files and minutes of group work via email to the lecturer <p>2. Regulations on time, attendance, and discipline in the course: attend class on time and at least 80% of the sessions (only to be absent for a maximum of 20%). An exam ban is applied to those who miss more than the regulated number of sessions. Students must have all test scores, lively discussions, constructive and serious statements in class.</p>
<p><i>Materials</i></p>	<p>4. Ministry of Education and Training. (2019). <i>Giáo trình Chủ nghĩa xã hội khoa học</i>, National Political Publishing House, Hanoi.</p> <p>5. Ministry of Education and Training. (2012). <i>Giáo trình Những Nguyên lý cơ bản của chủ nghĩa Mác - Lênin</i>, National Political Publishing House, Hanoi.</p> <p>6. Governing Body. (2008). <i>Giáo trình Chủ nghĩa xã hội khoa học</i>, National Political Publishing House, Hanoi.</p>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	SLO						
	1	2	3	4	5	6	7
1			x				
2			x				
3				x			

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*

7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1c		1.3a						2.6a
2	1.1c		1.3a						2.6a
3	1.1b		1.3c					2.5b	2.6b

3. Assessment plan

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

4. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:		HW/Assignment:	
Date:		Evaluator:	
	Max.	Score	Comments
Technical content (65%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	35		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (5%)			
	05		
TOTAL SCORE			
	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone		Milestone		Benchmark
	4	3	2	1	
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.	
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.	
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.	
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.	
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.	

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone		Milestone		Benchmark
	4	3	2	1	
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.	

Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

5. Date revised: April, 2022

Ho Chi Minh City, 04/2022
Head/Dean of Department/School
(Signature)



**VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY**
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name:

HISTORY OF VIETNAMESE COMMUNIST PARTY

Course Code: **PE018IU**

1. General information

<i>Module designation</i>	The course equips students with basic knowledge about the History of Communist Party of Vietnam
<i>Semester(s) in which the module is taught</i>	Semester 1 (3 rd year)
<i>Person responsible for the module</i>	Lecturers at School of Political and Administration Sciences, VNU-HCM
<i>Language</i>	<i>Vietnamese</i>
<i>Relation to curriculum</i>	<i>Compulsory</i>
<i>Teaching methods</i>	<i>Lecture, group discussion, presentation</i>
<i>Workload (incl. contact hours, self-study hours)</i>	<i>(Estimated) Total workload: 85</i> <i>Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 25</i> <i>Private study including examination preparation, specified in hours⁴: 60</i>
<i>Credit points</i>	<i>02 (.1 ECTS)</i>
<i>Required and recommended prerequisites</i>	1. Marxist-Leninist philosophy 2. Marxist-Leninist political economy 3. Scientific socialism

⁴ When calculating contact time, each contact hour is counted as a full hour. Because of the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<p><i>Module objectives</i></p>	<p>1. Knowledge: providing systematic and basic knowledge about the birth of the Communist Party of Vietnam (1920-1930), the Party's leadership over the Vietnamese revolution during the struggle for power (1930-1945), the two resistance wars against French and US colonialism (1945-1975), and national construction and defense during the period of the country's transition to socialism and carrying out the renovation work (1975-2018).</p> <p>2. Ideology: Through historical events and experiences to build a sense of respect for objective truths, raise pride and confidence in the Party's leadership.</p> <p>3. Skills: Equip with scientific thinking methods on history, skills in choosing research materials and studying subjects; and the ability to apply historical awareness to practical work and critical thinking toward false claims about the history of the Party.</p>
<p><i>Tentative learning outcomes</i></p>	<p>IV. Knowledge</p> <p><i>1. Objects, functions, tasks, contents and methods of research and study History of the Communist Party of Vietnam</i> Understand the objects, purposes of study and research and some basic requirements on learning and research methods</p> <p><i>2. The Communist Party of Vietnam was born and led the struggle for power (1930-1945)</i></p> <p>2.1. Understanding the historical context that influenced the birth of the Communist Party of Vietnam</p> <p>2.2. Understand the process of preparing the conditions for the establishment of the Party of Nguyen Ai Quoc</p> <p>2.3. Understand the contents of the Party's founding conference and the Party's first political platform</p> <p>2.4. Understand the historical significance of the establishment of the Communist Party of Vietnam</p> <p>2.5. Understanding the revolutionary movements of 1930-1935 and the policies of restoring the movement in 1932-1935</p> <p>2.6. Understanding the democracy movement in 1936-1939</p> <p>2.7. Understanding the national liberation movement in 1939-1945</p> <p>2.8. Understanding the nature, meaning and experience of the August Revolution in 1945</p> <p><i>3. The Party led two resistance wars, completed the national liberation and reunification (1945-1975)</i></p> <p>3.1. Understand the policy of building and defending the revolutionary government in 1945-1946</p> <p>3.2. Understand the line of national resistance against the French colonialists and the process of organizing its implementation from 1946 to 1950</p> <p>3.3. Understand the policy of promoting the resistance against the French colonialists and the implementation process from 1946 to 1950</p> <p>3.4. Understand the historical significance and experience of the Party in leading the resistance war against French colonialism and US intervention</p> <p>3.5. Understanding the Party's process of leading the two regions' revolutions in the 1954-1965 period</p> <p>3.6. Mastering the Party's revolutionary leadership in the 1965-1975 period</p> <p>3.7. Understand the meaning and experience of the Party's leadership in the resistance war against the US in 1954-1975</p>

	<p>4. The Party led the country in the transition to socialism and carried out the Doi moi (1975-2018)</p> <p>4.1. Understand the policy of building socialism and defending the Fatherland 1975-1981</p> <p>4.2. Understanding the contents of the 5th National Congress of the Party and the breakthroughs to continue economic renovation 1982-1986</p> <p>4.3. Understanding the Party's point of view of comprehensive renovation, bringing the country out of the 1986-1996 socio-economic crisis</p> <p>4.4. Understand the achievements and experiences of the innovation process</p> <p>4.5. Understand the great victories of the Vietnamese revolution under the leadership of the Party</p> <p>4.6. Understanding the great lessons of the Party's leadership from 1930 to 2018</p> <p>II. Skills</p> <p><i>Demonstrate the ability to generalize, think, debate, critique, and groupwork</i></p> <p>1. Exercise independent thinking capacity in researching the Party's revolutionary lines, strategies and tactics</p> <p>2. Have critical thinking, analytical, synthesis and evaluation skills related to the subject; and from there, apply the learned knowledge to actively and actively perceive political, economic, cultural and social issues according to the guidelines, policies and laws of the Party and State.</p> <p>3. Have writing skills, individual working skills, teamwork skills, and presenting research results</p> <p>III. Attitudes</p> <p><i>Express consciousness and awareness during and after learning</i></p> <p>1. Believe in the Party's leadership for the Vietnamese revolution</p> <p>2. Determine to strive for the implementation of the Party's revolutionary line</p> <p>3. Have a serious attitude in learning, scientific research, awareness of life and society, self-training to become a person of solid political quality, bravery, ethics, and good level of expertise; form affection and belief in the revolutionary path that our nation has chosen</p>																		
<p><i>Content</i></p>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: period (1 period = 50 minutes)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Introduction</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Objects, functions, tasks, contents and methods of research and study History of the Communist Party of Vietnam</td> <td>4</td> <td>I, T</td> </tr> <tr> <td>The Communist Party of Vietnam was born and led the struggle for power (1930-1945)</td> <td>5</td> <td>T</td> </tr> <tr> <td>The Party led two resistance wars, completed the national liberation and reunification (1945-1975)</td> <td>5</td> <td>I, T</td> </tr> <tr> <td>The Party led the country in the transition to socialism and carried out the Doi moi (1975-2018)</td> <td>5</td> <td>T, U</td> </tr> </tbody> </table>	Topic	Weight	Level	Introduction	1	I, T	Objects, functions, tasks, contents and methods of research and study History of the Communist Party of Vietnam	4	I, T	The Communist Party of Vietnam was born and led the struggle for power (1930-1945)	5	T	The Party led two resistance wars, completed the national liberation and reunification (1945-1975)	5	I, T	The Party led the country in the transition to socialism and carried out the Doi moi (1975-2018)	5	T, U
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<i>Examination forms</i>	Class discussion; Group presentations and reports; Mid-term exam; Final exam
<i>Study and examination regulations</i>	<p>1. Regulations for group presentations</p> <ul style="list-style-type: none"> - Forming a group: 5 students/group. The deadline for group topic registration on the forum is session 2 or directly submit it to the lecturer at the exam. - Week 4 (4th session) begin to present in order. Note that the presenting groups need to fully show up and bring along all relevant documents. - Submission form: submit files and minutes of group work via email to the lecturer <p>2. Regulations on time, attendance and discipline in the course: attend class on time and at least 80% of the sessions (only to be absent for a maximum of 20%). Exam ban is applied to those who miss more than the regulated number of sessions. Students must have all test scores, lively discussions, constructive and serious statements in class.</p>
Materials	<p>1. Ministry of Education and Training. (2019). <i>Chương trình môn học Lịch sử Đảng Cộng sản Việt Nam</i>.</p> <p>2. Governing Body directed the compilation of national textbooks of Marxist-Leninist sciences, Ho Chi Minh's Thoughts. (2018). <i>Giáo trình Lịch sử Đảng Cộng sản Việt Nam (revised and supplemented edition)</i>. National Political Publishing House, Hanoi.</p>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	SLO						
	1	2	3	4	5	6	7
1			x				
2			x				
3				x			

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*

7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1c		1.3a						2.6a
2	1.1c		1.3a						2.6a
3	1.1b		1.3c					2.5b	2.6b

3. Assessment plan

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

4. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:		HW/Assignment:	
Date:		Evaluator:	
	Max.	Score	Comments
Technical content (65%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	35		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (5%)			
	05		
TOTAL SCORE			
	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	monstrates complete understanding of the problem. All requirements of task are included in response
4	monstrates considerable understanding of the problem. All requirements of task are included.
3	monstrates partial understanding of the problem. Most requirements of task are included.
2	monstrates little understanding of the problem. Many requirements of task are missing.
1	monstrates no understanding of the problem.
0	response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

	audience.		appropriate to audience.	
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

5. Date revised: April , 2022

Ho Chi Minh City, 04/2022
Head/Dean of Department/School
(Signature)



**VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY**
School of Industrial Engineering and Management

COURSE SYLLABUS

**Course Name:
HO CHI MINH'S THOUGHTS**

Course Code: **PE019IU**

1. General information

<i>Module designation</i>	The course equips students with basic knowledge about subjects, research methods and meaning of Ho Chi Minh's ideologies; origin of Ho Chi Minh's ideologies; national independence and socialism; Communist Party of Viet Nam and the Vietnamese State; great national unity and international solidarity; culture, morality and human.
<i>Semester(s) in which the module is taught</i>	Semester 1 (3 rd year)
<i>Person responsible for the module</i>	Lecturers at School of Political and Administration Sciences, VNU-HCM
<i>Language</i>	<i>Vietnamese</i>
<i>Relation to curriculum</i>	<i>Compulsory</i>
<i>Teaching methods</i>	<i>Lecture, group discussion, presentation</i>
<i>Workload (incl. contact hours, self-study hours)</i>	<i>(Estimated) Total workload:85</i> <i>Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 25</i> <i>Private study including examination preparation, specified in hours⁵: 60</i>
<i>Credit points</i>	<i>02 (3.1 ECTS)</i>
<i>Required and recommended prerequisites</i>	1. Marxist-Leninist philosophy 2. Marxist-Leninist political economy 3. Scientific socialism

⁵ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<p><i>Module objectives</i></p>	<p>Knowledge: Equip students with basic knowledge about the concept, origin, process of formation and development of Ho Chi Minh's thoughts; the basic contents of Ho Chi Minh's thoughts; the application of the Communist Party of Vietnam in the national-democratic and socialist revolution in the current national renewal process.</p> <p>Skills: Form the skills of independent thinking, analyzing, evaluating and applying Ho Chi Minh's thought creatively to solve problems in life, study and work.</p> <p>Attitudes: Help students improve their political bravery, patriotism, loyalty to the goals and ideals of national independence associated with socialism; aware of the role and value of Ho Chi Minh's thoughts for the Vietnamese Party and nation; aware their responsibility in studying and training to contribute to the construction and defense of the Fatherland.</p>
<p><i>Tentative learning outcomes</i></p>	<p>I. Knowledge</p> <p>1. Concept, subject, research methodology and meaning of Ho Chi Minh ideology module</p> <p>1.1. Understand the concept of Ho Chi Minh's thoughts</p> <p>1.2. Understand the research object</p> <p>1.3. Grasp some basic requirements on learning and research methods of Ho Chi Minh's ideology</p> <p>1.4. Understand the meaning of learning ideological course</p> <p>2. The foundation, formation and development of Ho Chi Minh ideology</p> <p>2.1. Understand the practical basis, theoretical premise and subjective factors forming Ho Chi Minh's thoughts</p> <p>2.2. Understand the process of formation and development of Ho Chi Minh's thoughts</p> <p>2.3. Grasp the value of Ho Chi Minh's thoughts for the Vietnamese revolution and the progressive development of mankind</p> <p>3. Ho Chi Minh ideology on national independence and socialism</p> <p>3.1. Aware of the scientific, revolutionary and creative nature of Ho Chi Minh's thoughts on national independence and liberation revolution</p> <p>3.2. Grasp Ho Chi Minh's view on the necessity of socialism, building socialism and the transition period to socialism in Vietnam</p> <p>3.3. Understand Ho Chi Minh's view on the relationship between national independence and socialism</p> <p>3.4. Apply Ho Chi Minh's thoughts on national independence associated with socialism in the current revolution</p>

4. Ho Chi Minh ideology on the Communist Party of Vietnam of the people, by the people and for the people

4.1. Understand the basic contents of Ho Chi Minh's thoughts on the Communist Party of Vietnam

4.2. Understand the basic contents of Ho Chi Minh's thoughts on the state of the people, by the people, for the people

4.3. Apply Ho Chi Minh's thoughts to the construction of the Party and the State

5. Ho Chi Minh ideology on national great unity and international solidarity

5.1. Understand the basic views of Ho Chi Minh's thoughts on great national unity

5.2. Understand the basic views of Ho Chi Minh's thoughts on international solidarity

5.3. Apply Ho Chi Minh's thoughts on great national unity and international solidarity in the current period

6. Ho Chi Minh ideology on culture, morality and human

6.1. Grasp basic knowledge of Ho Chi Minh's thoughts on culture

6.2. Grasp basic knowledge of Ho Chi Minh's thoughts on new morality (revolutionary morality)

6.3. Grasp the basic knowledge of Ho Chi Minh's thoughts on culture

6.4. Apply Ho Chi Minh's thoughts on culture, morality and people in building the current Vietnamese culture, morality and human

II. Skills

Demonstrate the ability to generalize, think, debate, critique, and groupwork

1. Have skills in thinking, analyzing and evaluating Ho Chi Minh's thoughts.

2. Have skills in presenting, explaining, criticizing, debating and eloquent about theoretical knowledge being studied and researched based on practice.

3. Have skills in creatively applying Ho Chi Minh's thoughts to solving practical problems in life, study and work.

III. Attitudes

1. Recognize the role and value of Ho Chi Minh's thoughts for the Party and nation of Vietnam

2. Have political bravery, patriotism, loyalty to the goals and ideals of national independence associated with socialism

3. Recognize responsibility in studying, researching and applying knowledge in life to contribute to national construction and defense

<p><i>Content</i></p>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: period (1 period = 50 minutes)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Giới thiệu về môn học</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Concept, subject, research methodology and meaning of Ho Chi Minh ideology module</td> <td>2</td> <td>T</td> </tr> <tr> <td>The foundation, formation and development of Ho Chi Minh ideology</td> <td>3</td> <td>T</td> </tr> <tr> <td>Ho Chi Minh ideology on national independence and socialism</td> <td>3</td> <td>T, U</td> </tr> <tr> <td>Ho Chi Minh ideology on the Communist Party of Vietnam of the people, by the people and for the people</td> <td>3</td> <td>T, U</td> </tr> <tr> <td>Ho Chi Minh ideology on national great unity and international solidarity</td> <td>3</td> <td>T, U</td> </tr> <tr> <td>Ho Chi Minh ideology on culture, morality and human</td> <td>3</td> <td>I, T</td> </tr> </tbody> </table>	Topic	Weight	Level	Giới thiệu về môn học	1	I, T	Concept, subject, research methodology and meaning of Ho Chi Minh ideology module	2	T	The foundation, formation and development of Ho Chi Minh ideology	3	T	Ho Chi Minh ideology on national independence and socialism	3	T, U	Ho Chi Minh ideology on the Communist Party of Vietnam of the people, by the people and for the people	3	T, U	Ho Chi Minh ideology on national great unity and international solidarity	3	T, U	Ho Chi Minh ideology on culture, morality and human	3	I, T
Topic	Weight	Level																							
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Ho Chi Minh ideology on national great unity and international solidarity	3	T, U																							
Ho Chi Minh ideology on culture, morality and human	3	I, T																							
<p><i>Examination forms</i></p>	<p>Class discussion; Group presentations and reports; Mid-term exam: Multiple choice (closed-book) or essay (opened-book); Final exam: Essay (opened-book)</p>																								
<p><i>Study and examination regulations</i></p>	<p>- Regulations on assessment: according to the Regulations on the teaching and learning of Political Theory subjects of the School of Political and Administration Sciences.</p> <p>- Regulations on group presentation: Forming a group: 5 students/group.</p> <p>+ The deadline for group topic registration on the forum is session 2.</p> <p>+ Week 4 (4th session) begin to present in order. Note that the presenting groups need to fully show up and bring along all relevant documents.</p> <p>+ Submission form: submit files and minutes of group work via email to the lecturer.</p>																								
<p><i>Materials</i></p>	<ol style="list-style-type: none"> 1. Ministry of Education and Training (2019). <i>Giáo trình Tư tưởng Hồ Chí Minh</i>, National Political Publishing House, Hanoi. 2. School of Political and Administration Sciences VNU-HCM. <i>Tài liệu hướng dẫn học tập Tư tưởng Hồ Chí Minh</i>. 3. <i>Ho Chi Minh</i> (2011). Full volume, National Political Publishing House, Hanoi. 4. <i>Biography of Ho Chi Minh</i> (2016). National Political Publishing House, Hanoi. 																								

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	SLO						
	1	2	3	4	5	6	7
1			x				
2			x				

3				x			
---	--	--	--	---	--	--	--

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1c		1.3a						2.6a
2	1.1c		1.3a						2.6a
3	1.1b		1.3c					2.5b	2.6b

3. Assessment plan

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

4. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:		HW/Assignment:	
Date:		Evaluator:	
	Max.	Score	Comments
Technical content (65%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	35		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		

Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (5%)	05		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	monstrates complete understanding of the problem. All requirements of task are included in response
4	monstrates considerable understanding of the problem. All requirements of task are included.
3	monstrates partial understanding of the problem. Most requirements of task are included.
2	monstrates little understanding of the problem. Many requirements of task are missing.
1	monstrates no understanding of the problem.
0	response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.
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Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

5. Date revised: April, 2022

Ho Chi Minh City, 04/2022
Head/Dean of Department/School
(Signature)



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
Department of English

COURSE SYLLABUS

Course Name: Critical Thinking

Course Code: **PE008IU**

1. General information

<i>Course designation</i>	<p><i>This course provides the nature and techniques of thought as a basis for our claims, beliefs, and attitudes about the world. The course also explores the process in which people develop their claims and support their beliefs.</i></p> <p><i>Specifically, the course includes the theory and practice of presenting arguments in oral and written forms, making deductive and inductive arguments, evaluating the validity or strength of arguments, detecting fallacies in arguments, and refuting fallacious arguments.</i></p> <p><i>Resources for the reasoning process include hypothetical and real-life situations in various fields of natural sciences, social sciences, and humanities.</i></p>
<i>Semester(s) in which the course is taught</i>	1, 2, 3
<i>Person responsible for the course</i>	Trần Thanh Tú (Ph.D) Nguyễn Thị Thùy (Ph.D) Phạm Ngọc (Ph.D) Nguyễn Văn Tiếp (Ph.D) Vũ Tiến Thịnh (MA) Đỗ Thị Diệu Ngọc (MA)
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lectures, discussions, homework assignments, students' presentations
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (lecture, exercise): 37.5 Private study including examination preparation, specified in hours ⁶ : 100
<i>Credit points</i>	03 (5.0 ECTS)

⁶ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Required and recommended prerequisites for joining the course</i>	None	
<i>Course objectives</i>	<p>This course will enable students to</p> <ul style="list-style-type: none"> ● develop the habits of assessing and defending the reasonableness of their beliefs and values as well as those of others ● appreciate the importance of looking at an issue from a variety of perspectives ● apply critical thinking skills in both public and personal settings 	
<i>Course learning outcomes</i>	Upon the successful completion of this course, students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	<p>CLO1. Know the general concepts and standards of critical thinking; and comprehend the disadvantages of barriers to critical thinking in various contexts</p> <p>CLO2. Know the elements of an argument and two patterns of reasoning</p> <p>CLO3. Know the fallacies of relevance and insufficient evidence in arguments</p>
	Skill	<p>CLO4. Construct and evaluate deductive and inductive arguments in spoken and written forms</p> <p>CLO5. Test the validity of deductive arguments using Venn diagram and truth tables</p> <p>CLO6. Analyze and standardize arguments</p> <p>CLO7. Evaluate truth claims and refute arguments</p> <p>CLO8. Analyze weaknesses in inductive arguments to strengthen them</p>
Attitude	CLO9. Defend personal/group beliefs with good arguments and in appropriate manners (project presentations)	

<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (2 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Introduction to Critical thinking	3	I, T, U
	Recognizing arguments	3	T, U
	Basic logical concepts	3	T, U
	A little categorical logic	3	T, U
	A little propositional logic	3	T, U
	Logical fallacies I	3	T, U
	Logical fallacies II	3	T, U
	Review for Midterm test	3	U
	Analyzing arguments	3	T, U
	Evaluating arguments and truth claims	3	T, U
Inductive reasoning	3	T, U	
Project: Group presentation	9	U	
Review for Final Exam	3	U	
<i>Examination forms</i>	40 multiple-choice questions for the midterm and final exams and group presentations for the final project		
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Overall passing score: 50/100		
<i>Reading list</i>	[1] Bassham, Irwin, Nardone, and Wallace, <i>Critical Thinking: A Student's Introduction</i> , 6 th edition, McGraw-Hill Education, 2020. [2] Moore, B.N. et al. (2009). <i>Critical Thinking</i> , 9th ed. McGraw-Hill [3] Patrick J. Hurley (2012). <i>A Concise Introduction to Logic</i> (11 th ed.), Wadsworth, Cengage Learning + Relevant web resources		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-9) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1			x				
2			x				
3			x				
4					x		
5					x		

6					x		
7							x
8							x
9							x

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-9) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1c		1.3a						2.6a
2	1.1c		1.3a						2.6a
3	1.1c		1.3a						2.6a
4	1.1c		1.3b						2.6a
5	1.1c		1.3b						2.6a
6	1.1c		1.3b						2.6a
7	1.1a,b,c		1.3c			2.3a	2.4c		
8	1.1a,b,c		1.3c			2.3a	2.4c		
9	1.1a,b,c		1.3c			2.3a	2.4c		

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Critical thinking	1	HW 1/Quiz 1	Lecture, Discussion, Homework, Quiz	[1] Chapter 1
2	Recognizing arguments	2	HW 2/Quiz 2	Lecture, Discussion, Homework, Quiz	[1] Chapter 2
3	Basic logical concepts	2	HW 3/Quiz 3	Lecture, Discussion, Homework, Quiz	[1] Chapter 3
4	A little categorical logic	3	HW 4/Quiz 4	Lecture, Discussion, Homework, Quiz	[1] Chapter 9
5	A little propositional logic	3	HW 5/Quiz 5	Lecture, Discussion,	[1] Chapter 10

				Homework, Quiz	
6	Logical fallacies I	4	HW 6/Quiz 6	Lecture, Discussion, Homework, Quiz	[1] Chapter 5
7	Logical fallacies II	4	HW 7/Quiz 7	Lecture, Discussion, Homework, Quiz	[1] Chapter 6
8	Review for midterm exam + sample test				
9 + 10	Midterm exam: Chapters 1, 2, 3, 9, 10				
11	Analyzing arguments	5	HW 8/Quiz 8	Lecture, Discussion, Homework	[1] Chapter 7
12	Evaluating arguments and truth claims	5	HW 9/Quiz 9	Lecture, Discussion, Homework	[1] Chapter 8
13	Inductive reasoning	2	HW 10/Quiz 10	Lecture, Discussion, Homework	[1] Chapter 11
14	Project: Group presentation	6	Group work	Presentation, Discussion	
15	Project: Group presentation	6	Group work	Presentation, Discussion	
16	Project: Group presentation	6	Group work	Presentation, Discussion	
17	Review for final exam + sample test				
18	Reserved week				
19+20	Final exam: Chapters 5, 6, 7, 8, 11				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8	CLO9
Class participation and Assignments (30%)	80% Pass	80% Pass	80% Pass	80% Pass	80% Pass				80% Pass
Midterm exam (30%)						80% Pass	80% Pass	80% Pass	
Final exam (40%)						80% Pass	80% Pass	80% Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Date revised:

Date revised: 15 August, 2022
 By coordinator: Đỗ Thị Diệu Ngọc
 Contact details:
 Email: dtdngoc@hcmiu.edu.vn
 Mobile: 0904361717

Ho Chi Minh City, 15 August 2022
Head of Department
 (Signature)

Nguyễn Huy Cường



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
Department of English

COURSE SYLLABUS

Course Name: WRITING AE1 (ACADEMIC WRITING)

Course Code: **EN007IU**

1. General information

<i>Course designation</i>	<i>This course provides students with comprehensive instructions and practice in essay writing, including transforming ideas into different functions of writing such as process, cause-effect, comparison-contrast, and argumentative essays.</i>
<i>Semester(s) in which the course is taught</i>	1, 2, 3
<i>Person responsible for the course</i>	Lecturers of Department of English
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson, project
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 85 Contact hours (lecture, exercise): 25 Private study including examination preparation, specified in hours ⁷ : 60
<i>Credit points</i>	02 (3.1 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Students must fulfil ONE of the following requirements to attend this course: <ul style="list-style-type: none">● hold TOEFL iBT certificate with score ≥ 61● hold IELTS certificate with score ≥ 5.5● have completed IE2 course
<i>Course objectives</i>	Throughout the whole course, students are required to read university-level texts to develop the ability to read critically and to respond accurately, coherently and academically in writing. Through providing them with crucial writing skills such as brainstorming, paraphrasing, idea developing, revising, and editing, this course prepares the students for research paper writing in the next level of AE2 writing.

⁷ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course, students will be able to:		
	Competency level	Course learning outcome (CLO)	
	Knowledge	CLO1. Understand and follow different steps in the writing process to produce a complete essay CLO2. Employ different methods to improve their writing such as peer feedback and teacher comments	
	Skill	CLO3. Read critically, analyze and annotate an academic text CLO4. Use different functions of writing to successfully communicate their purposes to the audience (describe a process, discuss the causes and effects, compare and contrast, make arguments, paraphrase and summarize)	
Attitude	CLO5. Reason around ethical issues in writing academic essays and avoid committing plagiarism		
<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (2 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	The process of Academic Writing	1	I, T, U
	Using Outside Sources	3	T, U
	From Paragraph to Essay	4	T, U
	Process Essays	4	T, U
	Cause/Effect Essays	4	T, U
	Comparison/ Contrast Essays	4	T, U
Argumentative Essays	6	T, U	
Summarizing	2	U	
Review & Correction	2	U	
<i>Examination forms</i>	Essay writing		
<i>Study and examination requirements</i>	<i>Attendance</i>		
	Regular on-time attendance in this course is expected. A student will be allowed no more than three absences. It is compulsory that the students attend at least 80% of the course to be eligible for the final examination.		
	<i>Missed Tests</i>		
Students are not allowed to miss any of the tests (both Mid-term and Final). There are very few exceptions. Only with extremely reasonable excuses (eg. certified paper from doctors), students may re-take the examination.			
<i>Class Behaviors</i>			
Students are required to treat their studying in college as a full-time job and			

	<p>spend an adequate amount of time for this Writing AE1 course with approximately 8-10 hours per week (both in class and self-study). Accordingly, students are supposed to follow the obligations below:</p> <ul style="list-style-type: none"> - Prepare thoroughly for each class in accordance with the course syllabus and complete home assignments as the instructor's request. - Participate fully and constructively in all course activities and discussions (if any). - Display appropriate courtesy to all involved in the class. - Provide constructive feedback to faculty members regarding their performance. <p><i>Plagiarism</i></p> <p>Students are warned not to copy from other books or from their peers for all assessment tasks. Committing plagiarism will result in 0 point for the task. Students who plagiarize twice will be prohibited from sitting the final examination.</p> <p><i>Writing Center (Room 509)</i></p> <p>Students are encouraged to visit the Writing Center to schedule an appointment for additional help with essay writing.</p>
<p><i>Reading list</i></p>	<p>[1] Oshima, A., & Hogue, A. (2017). <i>Longman Academic Writing Series, Level 4: Essays</i> (5th ed.). New Jersey, NJ: Pearson Longman.</p> <p>[2] Oshima, A., & Hogue, A. (2006). <i>Longman Academic Writing Series, Level 4: Essays</i> (4th ed.). New Jersey, NJ: Pearson Longman.</p>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-5) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	SLO						
	1	2	3	4	5	6	7
1							X
2							X
3							X
4							X
5							X

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*

4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-5) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1a,b,c		1.3c			2.3a	2.4c		
2	1.1a,b,c		1.3c			2.3a	2.4c		
3	1.1a,b,c		1.3c			2.3a	2.4c		
4	1.1a,b,c		1.3c			2.3a	2.4c		
5	1.1a,b,c		1.3c			2.3a	2.4c		

3. Planned learning activities and teaching methods

Week	Coursebook		Homework
	Chapter	Pages	
1	<p>The process of Academic Writing Step 1: Creating (Prewriting) Step 2: Planning (Outlining) Step 3: Writing Step 4: Polishing</p> <p>Using Outside Sources Paraphrasing Plagiarism and how to avoid plagiarism</p>	<p>[2] pp. 265-279</p> <p>[1] pp. 58-65</p>	<ul style="list-style-type: none"> Do revising & editing exercises Read pp. [1] pp. 66-72
2	<p>Using Outside Sources (Cont'd) Strategies for writing a successful summary</p>	<p>[1] pp. 58 - 72</p>	<ul style="list-style-type: none"> Do paraphrasing exercises Read [1] pp.74-100. Read, take notes and write the summary of ONE of the following articles: <ul style="list-style-type: none"> The Challenge of Many Languages (p. 280) Nice by Nature? (p. 281) Marital Exchanges (pp. 283-4) Why We Should Send a Manned Mission to Mars (pp. 286-7) Let's Not Go to Mars (pp. 288-9)
3 & 4	<p>Review/ Correction: Lecturer gives feedback to one or two students' writings in class.</p> <p>From Paragraph to Essay The introductory paragraph: <ul style="list-style-type: none"> General statements & Introductory techniques Thesis statements & Logical division of ideas Body paragraphs: <ul style="list-style-type: none"> Topic sentences The concluding paragraph: <ul style="list-style-type: none"> Restatement Final thoughts Outlines of essays</p>	<p>[1] pp. 74 – 100</p>	<ul style="list-style-type: none"> Read pp. 101-15 Do exercises on: <ul style="list-style-type: none"> Writing thesis statements Writing topic sentences from the thesis statement provided Writing restatements
5	<p>Process Essays Introduction Analyzing the models Thesis statements for process essays Transitional signals Write together: Writing from a diagram (p.115)</p>	<p>[1] pp. 101 - 115</p>	<ul style="list-style-type: none"> Write a short essay (150-200 words) describing how hydroelectric power is generated (or a topic of the lecturer's choice)

6	<p>Process Essays (Cont'd) Review/ Correction: Lecturer gives feedback to one or two students' writings in class. <u>In-class Assignment:</u> Write a process essay about one of these topics or a topic of the lecturer's choice:</p> <ul style="list-style-type: none"> ● How to cook a favorite food ● How to do a favorite hobby ● How to succeed in your major area or professional field ● How to accomplish an academic task (register for classes, apply for a scholarship, pass an exam, etc.) 	[1] pp. 101 - 115	<ul style="list-style-type: none"> ● Read [1] pp. 116-132
7	<p>Cause/ Effect Essays Introduction Analyzing the models Organization Signal words and phrases Write together: Write the introduction, ONE body paragraph and the conclusion on one of the topics below or a topic of the lecturer's choice:</p> <ul style="list-style-type: none"> ● The cause of obesity ● The effects of involvement in sports on young children ● The causes of stress in college students ● The effects of regular reading on students' lives 	[1] pp. 116 - 132	<ul style="list-style-type: none"> ● Practice 4, 5,6 /pp. 127-9 ● Write the introduction, ONE body paragraph and the conclusion on one of the topics below or a topic of the lecturer's choice. The topic should be different from the one that has been used in class: <ul style="list-style-type: none"> ○ The cause of obesity ○ The effects of involvement in sports on young children ○ The causes of stress in college students ○ The effects of regular reading on students' lives
8	<p>Cause/ Effect Essays (Cont'd) Review/ Correction: Lecturer gives feedback to one or two students' writings in class. <u>In-class Writing:</u> Write the introduction, ONE body paragraph and the conclusion on one of the two topics left (except for the ones that has been worked on in class and assigned as homework) or a topic of the lecturer's choice:</p> <ul style="list-style-type: none"> ● The cause of obesity ● The effects of involvement in sports on young children ● The causes of stress in college students <p>The effects of regular reading on students' lives</p>		<ul style="list-style-type: none"> ● Give peer-feedback using the rubric provided

**MID-TERM
EXAMINATION**

9	<p>Comparison/ Contrast Essays Introduction Analyzing the models Organization:</p> <ul style="list-style-type: none"> ● Points of comparison ● Point-by-point organization ● Block organization <p>Comparison and Contrast signal words</p> <p>Write together: Write the introduction, ONE body paragraph and the conclusion on one of the topics below or a topic of the lecturer's choice:</p> <ul style="list-style-type: none"> ● Compare and contrast the relationship between parents and children in two different cultures. ● Compare and contrast the university culture in two different countries. ● Compare and contrast the culture of a small town and a big city. 	[1] pp. 133 - 151	<ul style="list-style-type: none"> ● Practice 3, 4, 6, 7/pp.142-6 ● Write the introduction, ONE body paragraph and the conclusion on one of the topics below or a topic of the lecturer's choice. The topic should be different from the one that has been used in class: <ul style="list-style-type: none"> ○ Compare and contrast the relationship between parents and children in two different cultures. ○ Compare and contrast the university culture in two different countries. ○ Compare and contrast the culture of a small town and a big city.
10	<p>Comparison/ Contrast Essays (Cont'd) Review/ Correction: Lecturer gives feedback to one or two students' writings in class. <u>In-class Assignment:</u> Write a compare and contrast essay on the topic left or a topic of the lecturer's choice:</p> <ul style="list-style-type: none"> ● Compare and contrast the relationship between parents and children in two different cultures ● Compare and contrast the university cultures in two different countries ● Compare and contrast the cultures of a small town and a big city 	[1] pp. 133 - 151	<ul style="list-style-type: none"> ● Read [1] pp. 152-168
11 & 12	<p>Argumentative Essays Introduction Analyzing the model</p>	[1] pp. 152-168	<ul style="list-style-type: none"> ● Write an argumentative essay (300 – 350 words) on ONE of the following topics or a topic

	<p>Organization: Block vs. Point-by-point pattern</p> <p>The elements of an argumentative essay:</p> <ul style="list-style-type: none"> ● An explanation of the issue ● A clear thesis statement ● A summary of the opposing arguments ● Rebuttals to the opposing arguments ● Your own arguments <p>The introductory paragraph: Thesis Statement Statistics as support</p> <p>Write together: Write the introduction, ONE body paragraph and the conclusion on one of the topics below or a topic of the lecturer's choice:</p> <ul style="list-style-type: none"> ● Can same-sex parenting negatively influence a child's mentality? ● Do famous artists have an innate talent, or do they put in great effort to improve their skills? ● Is homework helpful? 		<p>of the lecturer's choice:</p> <ul style="list-style-type: none"> ○ Can same-sex parenting negatively influence a child's mentality? ○ Do famous artists have an innate talent, or do they put in great effort to improve their skills? ○ Is homework helpful?
13	<p>Argumentative Essays (Cont'd) Review/ Correction: Lecturer gives feedback to one or two students' writings in class. In-class Writing: Write an argumentative essay on the topic left or a topic of the lecturer's choice:</p> <ul style="list-style-type: none"> ● Can same-sex parenting negatively influence a child's mentality? ● Do famous artists have an innate talent, or do they put in great effort to improve their skills? ● Is homework helpful? 		<ul style="list-style-type: none"> ● Give peer-feedback using the rubric provided
14	Review & Practice: Summarizing		Sample final test
15	<p>Review/Correction: Lecturer gives feedback to one or two students' argumentative essays + sample final test in class. Lecturer has students check their own assignment scores.</p>		
FINAL EXAMINATION			

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
Homework completion (10%)	80% Pass	80% Pass	80% Pass		
Week 6: In-class writing assignment: Process essay (10%)				80% Pass	
Week 10: In-class writing assignment: Compare & Contrast essay (10%)				80% Pass	
Midterm exam (30%)	80% Pass			80% Pass	80% Pass
Final exam (40%)				80% Pass	80% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Midterm exam rubrics (100 points)

TASK 1: Write 3 topic sentences and the restatement from a thesis statement: 40 points

Parts/ Points	Answers/ Criteria	CLO
Topic sentence 1 10 pts	○ The topic sentence introduces the topic and the controlling idea (1), starting with a transition signal*.	CLO 1
Topic sentence 2 10 pts	○ The topic sentence introduces the topic and the controlling idea (2), starting with a transition signal*.	CLO 1
Topic sentence 3 10 pts	○ The topic sentence introduces the topic and the controlling idea (3), starting with a transition signal*.	CLO 1
Restatement 10 pts	○ The 3 subtopics are well paraphrased: different words and structures while the meaning kept the same.	CLO 1

Notes:

*The students are supposed to use **a variety of connecting devices (single word, phrase, clause, or sentence)** to show their flexibility and expertise in writing.

TASK 2: Write a Cause/Effect essay: 60 points

Answers/ Criteria	Parts/ Points	CLO
Language use and Mechanics A wide variety of sentence patterns and vocabulary are presented correctly. Language used for <i>Cause-Effect Essay</i> is good and Meaning is clear. Spelling, capitalization, punctuation are correct.	10	CLO 1,4
Content The essay fulfills the requirements of the assignment & the topic is fully addressed. (15)	20	CLO 1,4,5

The essay is interesting to read and originally written by the student. (5)		
Organization <i>Introduction:</i> The introduction ends with a thesis statement. (10) <i>Body:</i> Each paragraph discusses a particular point and begins with a clear topic sentence. (5) Each paragraph has specific supporting details (fact, examples, etc.) (5) Each paragraph has cohesion and coherence. (5) <i>Conclusion:</i> The conclusion summarizes the main points/paraphrases the thesis statement, begins with a conclusion signal, and leaves the readers with the writer's thoughts on the topic. (5)	30	CLO 1,4
Total	60	

5.2. Final exam rubrics: Write an argumentative essay: 100 points

Criteria/ word count	300-350 words (100%)	200-299 words (80%)	Under 200 words (60%)	CLO
Language use and mechanics (20) A wide variety of sentence patterns and vocabulary are presented correctly. Language control is good, and meaning is clear. Spelling, capitalization and punctuation are correct.	20	16	12	CLO 1,4
Content: (20) The essay fulfills the task requirements, and the topic is fully addressed. The content is originally created by the students.	20	16	12	CLO 1,4,5
Organization: (60) <i>Introduction:</i> The introduction has a thesis statement. (10) <i>Body:</i> At least one paragraph discusses the counter-arguments. (10) Each paragraph discusses a particular point and begins with a clear topic sentence. (10) Each paragraph has specific supporting details (fact, examples, etc.). There are no sentences that	10 10 10 10	8 8 8 8	6 6 6 6	CLO 1,4

are off-topic. (10) Each paragraph has cohesion and coherence. There are transition signals to show the relationship among ideas and to link paragraphs. (10)	10	8	6	
Conclusion: The conclusion summarizes the main points and paraphrases the thesis statement, begins with a conclusion signal, and leaves the readers with the writer's final thought on the topic. (10)	10	8	6	
Total	100	80	60	

6. Date revised: 15 August, 2022

Ho Chi Minh City, 15 August 2022
Head of Department
(Signature)

Nguyễn Huy Cường



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
Department of English

COURSE SYLLABUS

Course Name: LISTENING AE1

Course Code: **EN008IU**

1. General information

<i>Course designation</i>	<i>The course is designed to prepare students for effective listening and note-taking skills, so that they can pursue the courses in their majors without considerable difficulty. The course is therefore lecture-based in that the teaching and learning procedure is built up on lectures on a variety of topics such as business, science, and humanities.</i>
<i>Semester(s) in which the course is taught</i>	1, 2, 3
<i>Person responsible for the course</i>	Lecturers of Department of English
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 85 Contact hours (lecture, exercise): 25 Private study including examination preparation, specified in hours ⁸ : 60
<i>Credit points</i>	02 (3.1 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Students must fulfil ONE of the following requirements to attend this course: <ul style="list-style-type: none">● hold TOEFL iBT certificate with score ≥ 6.0● hold IELTS certificate with score ≥ 5.5● complete IE2 course

⁸ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<p><i>Course objectives</i></p>	<p>There are a number of objectives embedded in various teaching activities in Listening AE1 course:</p> <p>Pre-listening activities: aim to activate students' current knowledge of the topic, and to provide them with lecture language and effective strategies in listening and note-taking to prepare themselves for the coming lecture. These activities include reading (this can be done before class meetings), discussing and reviewing what they have learned from the reading.</p> <p>While-listening and post-listening activities: aim to enable students to put their newly activated knowledge and acquired strategies into work by taking notes on the lecture, using the outline given by the teacher or prepared by themselves. They are later on asked to assess their understanding based on their notes and discuss them with their classmates. Finally, as an optional activity, depending on time and students' needs, students are asked to summarize the lecture.</p> <p>Follow-up activities: students are required to discuss the lecture topic and to prepare arguments for or against the topic in the debate. The purpose is to enhance students' comprehension of the lecture, and to allow them to put their acquired academic language into practice, and to experience the atmosphere of a university lecture class.</p>								
<p><i>Course learning outcomes</i></p>	<p>Upon the successful completion of this course, students will be able to:</p> <table border="1"> <thead> <tr> <th>Competency level</th> <th>Course learning outcome (CLO)</th> </tr> </thead> <tbody> <tr> <td>Knowledge</td> <td>CLO1. Remember different strategies and techniques in listening to academic lectures and taking notes. CLO2. Improve their specialized knowledge of academic lectures</td> </tr> <tr> <td>Skill</td> <td>CLO3. Respond to academic lectures with appropriate strategies CLO4. Communicate effectively with their classmates and professors.</td> </tr> <tr> <td>Attitude</td> <td>CLO5. Respond to academic lectures with confidence</td> </tr> </tbody> </table>	Competency level	Course learning outcome (CLO)	Knowledge	CLO1. Remember different strategies and techniques in listening to academic lectures and taking notes. CLO2. Improve their specialized knowledge of academic lectures	Skill	CLO3. Respond to academic lectures with appropriate strategies CLO4. Communicate effectively with their classmates and professors.	Attitude	CLO5. Respond to academic lectures with confidence
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Skill	CLO3. Respond to academic lectures with appropriate strategies CLO4. Communicate effectively with their classmates and professors.								
Attitude	CLO5. Respond to academic lectures with confidence								

<p><i>Content</i></p>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (2 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Orientation & Introduction of strategies and techniques in note-taking</td> <td>2</td> <td>I, T, U</td> </tr> <tr> <td>Chapter 1: New Trends in Marketing Research</td> <td>3</td> <td>T, U</td> </tr> <tr> <td>Chapter 2: Business Ethics</td> <td>3</td> <td>T, U</td> </tr> <tr> <td>Chapter 3: Trends in Children’s Media Use</td> <td>2</td> <td>T, U</td> </tr> <tr> <td>Chapter 4: The Changing Music Industry</td> <td>2</td> <td>T, U</td> </tr> <tr> <td>Chapter 5: The Placebo Effect</td> <td>2</td> <td>T, U</td> </tr> <tr> <td>Midterm Sample Test & Review</td> <td>2</td> <td>T, U</td> </tr> <tr> <td>Chapter 6: Intelligent Machines</td> <td>3</td> <td>T, U</td> </tr> <tr> <td>Chapter 7: Sibling Relationships</td> <td>3</td> <td>T, U</td> </tr> <tr> <td>Chapter 8: Multiple Intelligences</td> <td>3</td> <td>T, U</td> </tr> <tr> <td>Chapter 9: The Art of Graffiti</td> <td>3</td> <td>T, U</td> </tr> <tr> <td>Final Sample Test & Review</td> <td>2</td> <td>T, U</td> </tr> </tbody> </table>	Topic	Weight	Level	Orientation & Introduction of strategies and techniques in note-taking	2	I, T, U	Chapter 1: New Trends in Marketing Research	3	T, U	Chapter 2: Business Ethics	3	T, U	Chapter 3: Trends in Children’s Media Use	2	T, U	Chapter 4: The Changing Music Industry	2	T, U	Chapter 5: The Placebo Effect	2	T, U	Midterm Sample Test & Review	2	T, U	Chapter 6: Intelligent Machines	3	T, U	Chapter 7: Sibling Relationships	3	T, U	Chapter 8: Multiple Intelligences	3	T, U	Chapter 9: The Art of Graffiti	3	T, U	Final Sample Test & Review	2	T, U
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<p><i>Examination forms</i></p>	<p>Paper and pen tests: Correct the mistakes, Fill in the blanks, Write short answers, Write a summary paragraph.</p>																																							
<p><i>Study and examination requirements</i></p>	<p><i>Attendance</i> Regular on-time attendance in this course is expected. It is compulsory that students attend at least 80% of the course to be eligible for the final examination.</p> <p><i>Missed tests</i> Students are not allowed to miss any of the tests (both on-going assessment and final test). There are very few exceptions. (Only with extremely reasonable excuses, e.g. certified paper from doctors, may students re-take the tests.)</p> <p><i>Class behavior</i> Students are supposed to: prepare thoroughly for each class in accordance with the syllabus and complete all assignments upon the instructor’s request participate fully and constructively in all class activities (and discussions if any) display appropriate courtesy to all involved in the class provide constructive feedback to faculty members regarding their performance</p>																																							
<p><i>Reading list</i></p>	<p>[1] Frazie, L., & Leeming, S. (2013). <i>Lecture ready 3</i>. Oxford: Oxford University Press. References: [2] Frazie, L., & Leeming, S. (2013). <i>Lecture ready 1, 2</i>. Oxford: Oxford University Press.</p>																																							

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-5) and Intended Learning Outcomes (ILO) (1-7) is shown

in the following table:

CLO	SLO						
	1	2	3	4	5	6	7
1							X
2							X
3							X
4							X
5							X

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-5) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1a,b,c		1.3c			2.3a	2.4c		
2	1.1a,b,c		1.3c			2.3a	2.4c		
3	1.1a,b,c		1.3c			2.3a	2.4c		
4	1.1a,b,c		1.3c			2.3a	2.4c		
5	1.1a,b,c		1.3c			2.3a	2.4c		

3. Planned learning activities and teaching methods

WEEK	P	Chapter	Listening oriented activities	Speaking oriented activities
WEEK 1	2	ORIENTATION		
WEEK 2	2	Chapter 1 New Trends in Marketing Research	Recognizing topic introducing and lecture plan presenting expressions Organizing ideas by outlining	Expressing ideas during a discussion

WEEK 3	2	Chapter 2 Business Ethics	Recognizing transition expressions Using symbols and abbreviations	Asking for clarification and elaboration during a discussion
WEEK 4	2	REVIEW		
WEEK 5	2	Chapter 3 Trends in Children's Media Use	Recognizing generalization and support expressions	Giving opinions and asking for opinions during a discussion
WEEK 6	2	Chapter 4 The Changing Music Industry	Recognizing expressions for clarification or emphasis Organizing notes by using a split-page format	Expressing interest and asking for elaboration during a discussion
WEEK 7	2	Chapter 5 The Placebo Effect	Recognizing cause and effect expressions Noting causes and effects	Agreeing and disagreeing during a discussion
WEEK 8	2	Sample test correction WRAP-UP AND REVIEW		
MID-TERM EXAMINATION				
WEEK 9	2	Chapter 6 Intelligent Machines	Recognizing expressions used to predict causes and effects Using arrows to show the relationship between causes and effects	Learning to compromise and reach a consensus during a discussion
WEEK 10	2	REVIEW		
WEEK 11	2	Chapter 7 Sibling Relationships	Recognizing expressions of comparison and contrast Noting comparison and contrast	Expanding on ideas during a discussion
WEEK 12	2	Chapter 8 Multiple Intelligences	Recognizing non-verbal signals indicating important information Representing information in list form	Keeping the discussion on topic
WEEK	2	REVIEW		

13				
WEEK 14	2	Chapter 9 The Art of Graffiti	Recognizing expressions of definition Reviewing and practicing all note taking strategies	Indicating to other when preparing to speak or pausing to collect thoughts
WEEK 15	2	WRAP-UP AND REVIEW		
FINAL EXAMINATION				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
On-going assessment (30%) (Participation, individual work, group work, assignments, etc.)	80% Pass	80% Pass	80% Pass	80% Pass	80% Pass
Midterm exam (30%)	80% Pass		80% Pass		
Final exam (40%)	80% Pass		80% Pass		

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Date revised: 15 August, 2022

Date revised:

Ho Chi Minh City, 15 August 2022
Head of Department
(Signature)

Nguyễn Huy Cường



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
Department of English

COURSE SYLLABUS

Course Name: Writing AE2

Course Code: EN011IU

1. General information

<i>Course designation</i>	<i>This course introduces basic concepts in research paper writing, especially the role of generalizations, definitions, classifications, and the structure of a research paper to students who attend English- medium college or university. It also provides them with methods of developing and presenting an argument, a comparison or a contrast.</i>
<i>Semester(s) in which the course is taught</i>	1, 2, 3
<i>Person responsible for the course</i>	Lecturers of Department of English
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson, project
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 85 Contact hours (lecture, exercise): 25 Private study including examination preparation, specified in hours ⁹ : 60
<i>Credit points</i>	02 (3.1 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Students must complete Writing AE1 course

⁹ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	<p>Students are required to work on the tasks selected to maximize their exposure to written communication and are expected to become competent writers in the particular genre: the research paper.</p> <p>As writing is part of an integrated skill of reading and writing where reading serves as input to trigger writing, this course is designed to familiarize non-native students with academic literature in their major study by having them read and critically respond to texts of a variety of topics ranging from natural sciences such as biology to social sciences and humanities like education, linguistics and psychology.</p>																																				
<i>Course learning outcomes</i>	<p>Upon the successful completion of this course, students will be able to:</p> <table border="1"> <thead> <tr> <th>Competency level</th> <th>Course learning outcome (CLO)</th> </tr> </thead> <tbody> <tr> <td>Knowledge</td> <td>CLO1. Understand the structure of a research paper and employ appropriate academic language in writing a research paper</td> </tr> <tr> <td>Skill</td> <td>CLO2. Read critically, analyze, and annotate academic articles and journals CLO3. Employ the research writing skills obtained to work on their own paper in their major study.</td> </tr> <tr> <td>Attitude</td> <td>CLO4. Reason around ethical issues in writing research paper and avoid committing plagiarism</td> </tr> </tbody> </table>	Competency level	Course learning outcome (CLO)	Knowledge	CLO1. Understand the structure of a research paper and employ appropriate academic language in writing a research paper	Skill	CLO2. Read critically, analyze, and annotate academic articles and journals CLO3. Employ the research writing skills obtained to work on their own paper in their major study.	Attitude	CLO4. Reason around ethical issues in writing research paper and avoid committing plagiarism																												
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<i>Content</i>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (2 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Unit 1: The Academic Writing Process Introduction</td> <td>4</td> <td>I, T, U</td> </tr> <tr> <td>Unit 2: Researching and Writing</td> <td>2</td> <td>T, U</td> </tr> <tr> <td>Unit 3: Fundamentals & Feedback</td> <td>2</td> <td>T, U</td> </tr> <tr> <td>Unit 4: Definitions, Vocabulary & Clarity</td> <td>2</td> <td>T, U</td> </tr> <tr> <td>Unit 5: Generalizations, Facts and Honesty</td> <td>4</td> <td>T, U</td> </tr> <tr> <td>Unit 6: Seeing Ideas and Sharing Texts</td> <td>2</td> <td>T, U</td> </tr> <tr> <td>Unit 7: Description, Methods & Reality</td> <td>2</td> <td>T, U</td> </tr> <tr> <td>Unit 8: Results, Discussion & Relevance</td> <td>2</td> <td>T, U</td> </tr> <tr> <td>Unit 9: The Whole Academic Text</td> <td>2</td> <td>T, U</td> </tr> <tr> <td>Unit 10: Creating the Whole Text</td> <td>4</td> <td>T, U</td> </tr> <tr> <td>Course Review</td> <td>2</td> <td>U</td> </tr> </tbody> </table>	Topic	Weight	Level	Unit 1: The Academic Writing Process Introduction	4	I, T, U	Unit 2: Researching and Writing	2	T, U	Unit 3: Fundamentals & Feedback	2	T, U	Unit 4: Definitions, Vocabulary & Clarity	2	T, U	Unit 5: Generalizations, Facts and Honesty	4	T, U	Unit 6: Seeing Ideas and Sharing Texts	2	T, U	Unit 7: Description, Methods & Reality	2	T, U	Unit 8: Results, Discussion & Relevance	2	T, U	Unit 9: The Whole Academic Text	2	T, U	Unit 10: Creating the Whole Text	4	T, U	Course Review	2	U
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Course Review	2	U																																			
<i>Examination forms</i>	Essay writing																																				

Study and examination requirements

Attendance

Regular on-time attendance in this course is expected. A student will be allowed no more than three absences. It is compulsory that the students attend at least 80% of the course to be eligible for the final examination.

Assignment (Literature review)

Purpose: Students will use the knowledge of paraphrasing, summarising, developing arguments, and APA styles to write a 1,000-word literature review on a research scope of their choice.

Task:

- Follow guidelines on how to write a literature review.
- Use relevant academic writing skills such as paraphrasing, summarising, developing arguments, and APA 7th Style Guidelines – see <https://www.apastyle.org/>
- Develop arguments in relation to the research scope and identify the research gap

Notes: All papers should be typed, double-spaced, in 13-pt font, and with 1-inch margins. All papers must be original for this class. Criterion-referenced grading is used in this course.

Missed Tests

Students are not allowed to miss any of the tests (both Mid-term and Final). There are very few exceptions. Only with extremely reasonable excuses (eg. certified paper from doctors), students may re- take the examination.

Class Behaviors

Students are required to treat their studying in college as a full-time job and spend an adequate amount of time for this Writing AE2 course with approximately 8-10 hours per week (both in class and self- study).

Accordingly, students are supposed to follow the obligations below:

- Prepare thoroughly for each class in accordance with the course syllabus and complete home assignments as the instructor's request.
- Participate fully and constructively in all course activities and discussions (if any).
- Display appropriate courtesy to all involved in the class.
- Provide constructive feedback to faculty members regarding their performance.

Plagiarism

All forms of plagiarism and unauthorised collusion are seriously regarded and could result in penalties.

Plagiarism occurs when students copy or reproduce people's words or ideas and then present them as students' own work without proper acknowledgement, including when students copy the work of their fellow students.

Plagiarism in student submissions can be detected by:

- some web-based programs such as SafeAssign or Turnitin, or
- examiner's judgments with evidence of originals

The rater will review the paper to check if citations or references are provided properly. Penalties due to improper citations or references

	<p>include:</p> <table border="1"> <thead> <tr> <th>Degree of magnitude</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Below 15%</td> <td>Marked as it is.</td> </tr> <tr> <td>15% - 25%</td> <td>The score is deducted by 25%.</td> </tr> <tr> <td>25% - 40%</td> <td>The score is deducted by 50%</td> </tr> <tr> <td>Over 40%</td> <td>The score is 0.</td> </tr> </tbody> </table> <p>Notes: Part of the test is marked as it is if no plagiarism is detected. Students who plagiarize over 40% <u>twice</u> will be prohibited from sitting the final examination.</p> <p><i>Writing Center (Room 509)</i></p> <p>Students are encouraged to visit the Writing Center or to schedule an appointment for additional help.</p>	Degree of magnitude	Description	Below 15%	Marked as it is.	15% - 25%	The score is deducted by 25% .	25% - 40%	The score is deducted by 50%	Over 40%	The score is 0 .
Degree of magnitude	Description										
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Over 40%	The score is 0 .										
<i>Reading list</i>	<p>[1] Hamp-Lyons, L., & Heasley, B. (2006). <i>Study Writing</i>. Cambridge, UK: Cambridge University Press</p> <p>[2] Articles and Essays taken from <i>The Allyn and Bacon Guide to Writing</i> by Ramage et al (2009), Pearson Longman.</p> <p>[3] Cormack, J. & Slaughter, J. (2009). <i>English for academic study: Extended writing and research skills</i>. Cambridge: Cambridge University Press. Garnet Education</p> <p>[4] Folse, K. S. & Pugh, T. (2010). <i>Great writing 5: Greater essays</i>. Boston: Heinle, Cengage Learning.</p> <p>[5] Keezer, S. (Ed.) (2003). <i>Write your research report: A real-time guide</i>. New Jersey: Pearson Learning Group.</p> <p>[6] Kumar, R. (2019). <i>Research methodology: A step-by-step guide for beginners</i>. Sage Publications</p>										

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	SLO						
	1	2	3	4	5	6	7
1							X
2							X
3							X
4							X

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

- 1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
- 2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
- 3. an ability to communicate effectively with a range of audiences*

4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-4) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1a,b,c		1.3c			2.3a	2.4c		
2	1.1a,b,c		1.3c			2.3a	2.4c		
3	1.1a,b,c		1.3c			2.3a	2.4c		
4	1.1a,b,c		1.3c			2.3a	2.4c		

3. Planned learning activities and teaching methods

WEEK	CONTENT—SUGGESTED TASKS	ASSIGNMENT/ HOMEWORK
1	Orientation of the Course Unit 1: The Academic Writing Process Introduction	
2	Unit 1: The Academic Writing Process (Cont.) Thinking about writing processes Distinguishing between academic and personal styles of writing Grammar of academic discourse	HW: Task 10
3	Unit 2: Researching and Writing Recognizing categories and classification The language of classification The structure of a research paper	HW: Task 17
4	Unit 3: Fundamentals & Feedback Exploring comparison and contrast structures The language of comparison and contrast Using comparisons and contrasts to evaluate and recommend	HW: Task 12
5	Unit 3: Fundamentals & Feedback (Cont.) The research paper Identifying a research gap The writing process	Assignment 1: Task 20
6	Unit 4: Definitions, Vocabulary & Clarity The clarity principle The language of definition The place of definition The writing process	HW: Task 15
7	Unit 5: Generalizations, Facts and Honesty Honesty principle The language of generalization	HW: Task 13
8	Unit 5: Generalizations, Facts and Honesty (Cont.) Writing a literature review The writing process Brainstorming and clustering APA 7th Style Guidelines – see https://www.apastyle.org/	Assignment 2: Writing Literature review
MID-TERM EXAMINATION		
9	Unit 6: Seeing Ideas and Sharing Texts Writing about events in time Connecting events Learning about peer reviews	HW: Tasks 12 & 13

10	Unit 7: Description, Methods & Reality Describing processes and products The language for writing about processes Writing the Methods section Giving and getting formal peer feedback	HW: Tasks 9 & 11
11	Unit 8: Results, Discussion & Relevance What is an argument? The language of argument The Results and Discussion sections Finding an academic voice	HW: Task 9
12	Unit 9: The Whole Academic Text S-P-S-E: Focus on structure S-P-S-E in the introduction The language of coherence and connection Teacher evaluation	HW: Task 9
13	Unit 10: Creating the Whole Text Structure of the research paper Creating your own research	
14	Unit 10: Creating the Whole Text Plagiarism Creating citations Paraphrase and summary Authorial identity	
15	Course Review	Submitting Literature review
FINAL EXAM		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Class participation and Assignments (30%)	80% Pass	80% Pass	80% Pass	
Midterm exam (30%)	80% Pass		80% Pass	80% Pass
Final exam (40%)	80% Pass		80% Pass	80% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Midterm exam sample rubrics (100 points)

TASK 1: 30 points

CATEGORIES	CRITERIA	POINTS	CLO
Category	Farm animals seem to have more complex cognitive and social skills	7.5	CLO 1,2
Sub-category 1	1. Sheep experience stress a. increase stress (when isolated from the flock) b. reduce stress (when seeing familiar sheep faces)	7.5	
Sub-category 2	2. Cows' co-operative partnerships & physiological response on learning something new a. Those learning tasks experience an increase in heart rate (when facing same situation). b. Those not learning tasks do not experience a heart rate increase.	7.5	CLO 1,2
Sub-category 3	3. Pigs' different reactions react differently based on past experience a. avoid the place where they have been shut for long b. go for the place where they were released from quickly.	7.5	CLO 1,2
Total		30	

TASK 2: 70 points

CATEGORIES	CRITERIA	POINTS	CLO
Content	All main points relevant to topic Essay question fully answers	20	CLO 1,3,4
Organization	Topic and purpose of the essay discussed in the introduction Each main point discussed in a paragraph All main points summarized and rephrased in the conclusion	20	CLO 1,3,4
Coherence	Paragraphs ordered in a systematic manner based on, for example, importance, priority, etc. Comparison/contrast transitions are properly used.	15	CLO 1,3,4
Style and Tone	Formal writing with full forms Polite writing Academic vocabulary	15	CLO 1,3,4
Total		70	

5.2. Final exam rubrics: 100 points

CATEGORIES	CRITERIA	POINTS	CLO
Content	<ul style="list-style-type: none"> Presenting his/her view on the question clearly and persuasively 	20	CLO 1,3,4
Structure of ideas	<ul style="list-style-type: none"> Introduction with thesis statement, and conclusion with summary and comment Topic sentences well supported with explanations, examples, etc. 	40	CLO 1,3,4
Convincing argumentative techniques, e.g., counterargument		20	CLO 1,3,4
Language use: <i>use vocabulary and grammatical structures</i>		20	CLO 1,3,4
Total		100	

Date revised: 15 August, 2022

Ho Chi Minh City, 15 August 2022
Head of Department
(Signature)

Nguyễn Huy Cường



**VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY**
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: SCIENTIFIC WRITING

Course Code: **IS079IU**

1. General information

<i>Course designation</i>	This course aims to improve students' academic and scientific writing in English, and helps them successfully complete course reports, thesis, dissertations, and articles for publication as well as doing a proper presentation, etc.
<i>Semester(s) in which the course is taught</i>	5
<i>Person responsible for the course</i>	Dr. Dao Vu Truong Son
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, Exercises, Assignment.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 85 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 25 Private study including examination preparation, specified in hours ¹⁰ : 60
<i>Credit points</i>	02 (3.1 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Nil
<i>Course objectives</i>	This course is offered for undergraduate students at ISE Department, IU. It aims to improve students' academic and scientific writing in English, and helps them successfully complete course reports, thesis, dissertations, and articles for publication as well as doing a proper presentation, etc. Upon completion of the course, we hope our students become more effective, more efficient, and more confident writers.

¹⁰ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:		
	Competency level	Course learning outcome (CLO)	
	Knowledge	CLO1. Students can understand structures of scientific papers.	
	Skill	CLO2. Students write course reports, thesis, and dissertations.	
Attitude	CLO3. Students will have positive attitude in both self-learning and group discussion with other disciplines related to scientific writing problems.		
<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (3 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Introduction	4	I, T
	Literature review	4	I, T
	Describing methods, materials and processes	6	I, T
	Presenting results and other visualization techniques	6	I, T
Writing abstract and conclusion	4	I, T	
Poster and oral presentation	4	T, U	
<i>Examination forms</i>	Practice, Writing questions		
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
<i>Reading list</i>	Engineering your report – from start to finish, L.A. Krishnan, R. Jong, S. Kathpalia and T.M. Kim, Prentice Hall, 2003.		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	SLO						
	1	2	3	4	5	6	7
1							X
2							X
3							X

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
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5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes									
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6	
1	1.1a,b,c		1.3c			2.3a	2.4c			
2	1.1a,b,c		1.3c			2.3a	2.4c			
3	1.1a,b,c		1.3c			2.3a	2.4c			

3. Planned learning activities and teaching methods

Week	Topic	CL O	Assessments	Learning activities	Resources
1,2	Introduction	1	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].1
3,4	Literature review	1, 2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].2
5,6,7	Describing methods, materials and processes	2,3	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1] 3
8	Review		Exercises		
9	Midterm				
10,11,12	Presenting results and other visualization techniques	4	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].4
13,14	Writing abstract and conclusion	3, 4	Exercises, HW, Quiz	Lecture, Discussion, Inclass-Quiz	[1].5
15,16	Poster and oral presentation	3, 4	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].6
17	Review				
18	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
Project (30%)	50% Pass	50% Pass	50% Pass
Midterm exam (30%)	60% Pass	60% Pass	
Final exam (40%)		60% Pass	60% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:		HW/Assignment:	
Date:		Evaluator:	
	Max.	Score	Comments
Technical content (65%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	35		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (5%)			
	05		
TOTAL SCORE			
	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.

Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: April, 2022

Ho Chi Minh City, 04/2022

Dean of School of Industrial Engineering and Management

(Signature)



Assoc. Prof. Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
Department of Mathematics

COURSE SYLLABUS

Course Name: Calculus 1

Course Code: MA001IU

1. General information

<i>Course designation</i>	This course equip students with basic concepts of calculus: limits, continuity, differentiation, and integration. Applications of these concepts are extensively discussed.
<i>Semester(s) in which the course is taught</i>	1, 2
<i>Person responsible for the course</i>	
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lectures, assignments
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 170 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 50 (lectures) Private study including examination preparation, specified in hours ¹¹ : 120
<i>Credit points</i>	4 (6.2 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None

¹¹ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<p><i>Course objectives</i></p>	<ol style="list-style-type: none"> 1. To provide students with the main ideas and techniques of calculus. These include limits, continuity, differentiation, and integration. 2. To introduce practical applications of these ideas and techniques, through practical examples taken from many areas of engineering, business, and life sciences. 3. To develop skills in mathematical modelling and problem solving, ability to think logically, and adapt these skills creatively to new situations 								
<p><i>Course learning outcomes</i></p>	<p>Upon the successful completion of this course students will be able to:</p> <table border="1"> <thead> <tr> <th>Competency level</th> <th>Course learning outcome (CLO)</th> </tr> </thead> <tbody> <tr> <td>Knowledge</td> <td> CLO1. Have basic knowledge of limits and derivatives (Program outcomes: a) CLO2. Have basic knowledge of definite/indefinite integrals (Program outcomes: a) </td> </tr> <tr> <td>Skill</td> <td> CLO3. Can compute often used limits, can define and compute derivatives (Program outcomes: a, j) CLO4. Can compute standard types of integrals. Use integrals in practical situations (Program outcomes: a, j) </td> </tr> <tr> <td>Attitude</td> <td> CLO5. Confident when dealing with derivatives and integrals. Comfortable with using derivatives and integrals in practical situations. (Program outcome: j, k) </td> </tr> </tbody> </table>	Competency level	Course learning outcome (CLO)	Knowledge	CLO1. Have basic knowledge of limits and derivatives (Program outcomes: a) CLO2. Have basic knowledge of definite/indefinite integrals (Program outcomes: a)	Skill	CLO3. Can compute often used limits, can define and compute derivatives (Program outcomes: a, j) CLO4. Can compute standard types of integrals. Use integrals in practical situations (Program outcomes: a, j)	Attitude	CLO5. Confident when dealing with derivatives and integrals. Comfortable with using derivatives and integrals in practical situations. (Program outcome: j, k)
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<p><i>Content</i></p>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (4 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Functions and Graphs, Inverse Functions, Exponential and Logarithmic Functions</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Parametric Curves, Limit. One-sided Limits, Laws of Limits</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Evaluating Limits. The Squeeze Theorem. Continuity. The Intermediate Value Theorem</td> <td>1</td> <td>T, U</td> </tr> <tr> <td>Tangent Lines and Velocity Problems. Rates of Change, Derivative.</td> <td>1</td> <td>T, U</td> </tr> <tr> <td>Higher-Order Derivatives, Rules of Differentiation. Rates of Change in the Natural and Social Sciences</td> <td>1</td> <td>T, U</td> </tr> <tr> <td>Implicit Differentiation, Differentiation of Inverse Functions,</td> <td>1</td> <td>T, U</td> </tr> <tr> <td>Logarithmic Differentiation, Linear Approximations. Differentials.</td> <td>1</td> <td>T, U</td> </tr> <tr> <td>Related Rates, Maxima and Minima. Critical Point, The Mean Value Theorem.</td> <td>1</td> <td>T, U</td> </tr> <tr> <td>The First and Second Derivative Test, Concavity. Shapes of Curves, Curve Sketching</td> <td>1</td> <td>T, U</td> </tr> <tr> <td>Indeterminate Forms and l'Hôpital's Rules, Maxima and Minima Problems, Newton's Method</td> <td>1</td> <td>T, U</td> </tr> <tr> <td>Anti-derivatives and Indefinite Integrals, The Definite Integral</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Properties of the Definite Integral. The Fundamental Theorem of Calculus, Integration by Substitution</td> <td>1</td> <td>I, T, U</td> </tr> <tr> <td>Integration by Parts, Partial Fractions, Numerical Integration,</td> <td>1</td> <td>T, U</td> </tr> <tr> <td>Improper Integrals, Areas between Curves Areas Enclosed by Parametric Curves</td> <td>1</td> <td>T, U</td> </tr> <tr> <td>Volumes, Arc Length, Applications to Engineering, Economics and Science</td> <td>1</td> <td>T, U</td> </tr> </tbody> </table>	Topic	Weight	Level	Functions and Graphs, Inverse Functions, Exponential and Logarithmic Functions	1	I, T	Parametric Curves, Limit. One-sided Limits, Laws of Limits	1	I, T	Evaluating Limits. The Squeeze Theorem. Continuity. The Intermediate Value Theorem	1	T, U	Tangent Lines and Velocity Problems. Rates of Change, Derivative.	1	T, U	Higher-Order Derivatives, Rules of Differentiation. Rates of Change in the Natural and Social Sciences	1	T, U	Implicit Differentiation, Differentiation of Inverse Functions,	1	T, U	Logarithmic Differentiation, Linear Approximations. Differentials.	1	T, U	Related Rates, Maxima and Minima. Critical Point, The Mean Value Theorem.	1	T, U	The First and Second Derivative Test, Concavity. Shapes of Curves, Curve Sketching	1	T, U	Indeterminate Forms and l'Hôpital's Rules, Maxima and Minima Problems, Newton's Method	1	T, U	Anti-derivatives and Indefinite Integrals, The Definite Integral	1	I, T	Properties of the Definite Integral. The Fundamental Theorem of Calculus, Integration by Substitution	1	I, T, U	Integration by Parts, Partial Fractions, Numerical Integration,	1	T, U	Improper Integrals, Areas between Curves Areas Enclosed by Parametric Curves	1	T, U	Volumes, Arc Length, Applications to Engineering, Economics and Science	1	T, U
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<p><i>Study and examination requirements</i></p>	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>																																																
<p><i>Reading list</i></p>	<p>J. Stewart, <i>Calculus</i>, Thomson Learning, 7th edition, 2012.</p>																																																

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-5) and Intended Learning Outcomes (ILO) (1-

7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2	x						
3						x	
4						x	
5							x

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-5) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a,b	1.3d	2.1a,b	2.2a				
2		1.2a,b	1.3d	2.1a,b	2.2a				
3		1.2a	1.3d		2.2b		2.4b	2.5a	
4		1.2a	1.3d		2.2b		2.4b	2.5a	
5	1.1a,b,c		1.3c			2.3a	2.4c		

3. Planned learning activities and teaching methods

Week	Topics	CLO	Assessment	Teaching and Learning activities
1	Functions and Graphs, Inverse Functions, Exponential and Logarithmic Functions	1,3		Lecture
2	Parametric Curves, Limit. One-sided Limits, Laws of Limits.	1,3	Quiz	Lectures and Quiz
3	Evaluating Limits. The Squeeze Theorem. Continuity. The Intermediate Value Theorem	3, 5	Quiz	Lectures and Quiz
4	The Tangent and Velocity Problems.	3, 5	HW1	Lectures and HW

	Rates of Change, The Derivative.			
5	Higher-Order Derivatives, Rules of Differentiation. Rates of Change in the Natural and Social Sciences	3, 5	Quiz	Lectures and Quiz
6	Implicit Differentiation, Differentiation of Inverse Functions,	3, 5	HW2	Lectures and HW
7	Logarithmic Differentiation, Linear Approximations. Differentials.	3, 5	Quiz	Lectures and Quiz
8	Related Rates, Maxima and Minima. Critical Point, The Mean Value Theorem.	3, 5	HW3	Lectures and HW
Midterm Exam				
9	The First and Second Derivative Test, Concavity. Shapes of Curves, Curve Sketching	2, 4	Quiz	Lectures and Quiz
10	Indeterminate Forms and l'Hôpital's Rules, Maxima and Minima Problems, Newton's Method	2, 4	Quiz	Lectures and Quiz
11	Anti-derivatives and Indefinite Integrals, The Definite Integral	4, 5	HW4	Lectures and HW
12	Properties of the Definite Integral. The Fundamental Theorem of Calculus, Integration by Substitution	2, 4	Quiz	Lectures and Quiz
13	Integration by Parts, Partial Fractions, Numerical Integration,	4, 5	Quiz	Lectures and Quiz
14	Improper Integrals, Areas between Curves Areas Enclosed by Parametric Curves	2, 4, 5	HW5	Lectures and HW
15	Volumes, Arc Length, Applications to Engineering, Economics and Science	1, 2, 3, 4, 5	Exercises	
Final Exam		1, 2, 3, 4, 5		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
In-class exercises/ quizzes (10%)	Qz1->Qz4 80% Pass	Qz5->Qz8 80%Pass	Qz1->Qz4 80% Pass	Qz5->Qz8 80% Pass	Qz2, 4, 6, 8 70% Pass
Homework exercises (10%)	HW1->H3 70% Pass	HW4, HW5 70%	HW1->HW3 70% Pass	HW4, HW5 70%	HW1->HW5 60% Pass
Midterm exam (30%)	Q1, Q2 80% Pass		Q3, Q4 70% Pass		Q5 50%

Final exam (50%)		Q1, Q2 80%Pass		Q3, Q4 70%Pass	Q5 50%
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Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Date revised: January 12, 2022

Ho Chi Minh City, 01/2022

Dean of School of Industrial Engineering and Management

(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
Department of Mathematics

COURSE SYLLABUS
Course Name: Calculus 2
Course Code: MA003IU

1. General information

<i>Course designation</i>	This course is a continuation of Calculus 1. Its aim to equip student with basis concepts of sequence, series, vector functions, functions of several variables, multiple integrals and their applications
<i>Semester(s) in which the course is taught</i>	1, 2
<i>Person responsible for the course</i>	Assoc. Prof. Mai Duc Thanh, Assoc. Prof. Tran Vu Khanh, Dr. Nguyen Minh Quan, Dr. Nguyen Anh Tu, Dr. Ta Quoc Bao.
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lectures, assignments
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 170 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 50 (lectures) Private study including examination preparation, specified in hours ¹² : 120
<i>Credit points</i>	4 (6.2 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Calculus 1

¹² When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<p><i>Course objectives</i></p>	<ol style="list-style-type: none"> 1. To provide students with the main ideas and techniques of calculus. These include sequences, series, functions of several variables, optimal problems, multiple integrals, vector calculus. 2. To introduce practical applications of these ideas and techniques, through practical examples taken from many areas of engineering, business, and life sciences. 3. To develop skills in mathematical modelling and problem solving, ability to think logically, and adapt these skills creatively to new situations 								
<p><i>Course learning outcomes</i></p>	<p>Upon the successful completion of this course students will be able to:</p> <table border="1"> <thead> <tr> <th>Competency level</th> <th>Course learning outcome (CLO)</th> </tr> </thead> <tbody> <tr> <td>Knowledge</td> <td> CLO1. Have basic knowledge of series, functions of several variables, multiple integrals (Program outcomes: a) CLO2. Have basic knowledge of vector calculus (Program outcomes: a) </td> </tr> <tr> <td>Skill</td> <td> CLO3. Can compute partial derivatives, multiple integral (Program outcomes: a, j) CLO4. Can show the convergence of a sequence and a series and use power series to simplify computation. Can show the optimal problem using partial derivatives, can find the volume of an object in higher dimension by using the multiple integrals (Program outcomes: i, h) </td> </tr> <tr> <td>Attitude</td> <td> CLO5. Confident when dealing with partial derivatives, multiple integrals. Comfortable with using partial derivatives and multiple integrals in practical situations. (Program outcome: j, k) </td> </tr> </tbody> </table>	Competency level	Course learning outcome (CLO)	Knowledge	CLO1. Have basic knowledge of series, functions of several variables, multiple integrals (Program outcomes: a) CLO2. Have basic knowledge of vector calculus (Program outcomes: a)	Skill	CLO3. Can compute partial derivatives, multiple integral (Program outcomes: a, j) CLO4. Can show the convergence of a sequence and a series and use power series to simplify computation. Can show the optimal problem using partial derivatives, can find the volume of an object in higher dimension by using the multiple integrals (Program outcomes: i, h)	Attitude	CLO5. Confident when dealing with partial derivatives, multiple integrals. Comfortable with using partial derivatives and multiple integrals in practical situations. (Program outcome: j, k)
Competency level	Course learning outcome (CLO)								
Knowledge	CLO1. Have basic knowledge of series, functions of several variables, multiple integrals (Program outcomes: a) CLO2. Have basic knowledge of vector calculus (Program outcomes: a)								
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Attitude	CLO5. Confident when dealing with partial derivatives, multiple integrals. Comfortable with using partial derivatives and multiple integrals in practical situations. (Program outcome: j, k)								

<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (4 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Sequences and Convergence	1	I, T
	Series	1	I, T
	Tests for Convergence	1	T, U
	Power series	1	T, U
	Representations of Functions as Power series	1	T, U
	Taylor and Maclaurin series	1	T, U
	Vector Functions and Space Curves, Limit and continuity of vector functions	1	I, T
	Derivatives and Integrals of vector functions, Length of space curves	1	T, U
	Functions of Several Variables, Limits and Continuity	1	I,T
	Partial Derivatives, Tangent Plane and Linear Approximations	1	T, U
	Chain Rules, Directional Derivatives and Gradient	1	T, U
Maximum and Minimum Values of Functions of two variables	1	T, U	
Lagrange Multipliers and Applications	1	T, U	
Double Integrals in Rectangles, Iterated Integrals	1	I, T	
Double, Triple Integrals in General regions and Applications	2	T,U	
<i>Examination forms</i>	Written examination		
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
<i>Reading list</i>	J. Stewart, <i>Calculus</i> , Thomson Learning, 7 th edition, 2012.		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-5) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2	x						

3						x	
4						x	
5							x

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-5) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a,b	1.3d	2.1a,b	2.2a				
2		1.2a,b	1.3d	2.1a,b	2.2a				
3		1.2a	1.3d		2.2b		2.4b	2.5a	
4		1.2a	1.3d		2.2b		2.4b	2.5a	
5	1.1a,b,c		1.3c			2.3a	2.4c		

3. Planned learning activities and teaching methods

Week	Topics	CLO	Assessment	Teaching and Learning activities
1	Sequences, Series, The Integral Test and Estimates Sums, The comparison Tests	2, 4	HW	Lectures and Quiz
2	Alternating Series, Absolute Convergence and the Ratio and Roots Tests, Strategy for Testing Series	2, 4	HW	Lectures and Quiz
3	Power Series, Representations of Functions as Power Series, Taylor & Maclaurin Series, Applications of Taylor Polynomials	4, 5	Quiz	Lectures and Quiz
4	3D Coordinate Systems, Vectors, The Dot Product, The Cross	2, 4	HW	Lectures and Quiz

	Product, Equations of Lines and Planes, Functions of Surface.			
5	Vector Functions and Space Curves, Derivatives and Integrals of Vector Functions, Arc Length, Parametric Surfaces	4, 5	HW	Lectures and Quiz
6	Functions of Several Variables, Limit and Continuity,	2, 4, 5	Quiz	Lectures and Quiz
7	Partial Derivatives, Tangent Planes and Linear Approximations,	3, 5	HW	Lectures and Quiz
8	Chain Rule, Directional Derivatives and Gradient Vectors,	3, 5	HW	Lectures and Quiz
Midterm Exam				
9	Maximum and Minimum Values, Lagrange Multipliers	2, 4	HW	Lectures and Quiz
10	Double Integrals over Rectangles, Iterated Integrals, Double Integrals over General Regions	2, 4	HW	Lectures and Quiz
11	Double Integrals in Polar Coordinates, Application of Double Integrals.	4, 5	HW	Lectures and Quiz
12	Triple Integrals, Triple Integrals in Cylindrical and Spherical Coordinates. Change of Variables in Multiple Integrals	2, 4	Quiz	Lectures and Quiz
13	Vector Fields, Line Integrals, the Fundamental Theorem for Line Integrals	4, 5	HW	Lectures and Quiz
14	Green's Theorem, Curl and Divergence, Surface Integrals	2, 4, 5	HW	Lectures and Quiz
15	Stokes' Theorem, Divergence Theorem.	1, 2, 3, 4, 5	Exercises	
Final Exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
In-class exercises/ quizzes (10%)	Qz1->Qz4 80% Pass	Qz5->Qz8 80% Pass	Qz1->Qz4 80% Pass	Qz5->Qz8 80% Pass	Qz2, 4, 6, 8 70% Pass
Homework exercises (10%)	HW1->HW3 70% Pass	HW4, HW5 70%	HW1->HW3 70% Pass	HW4, HW5 70%	HW1->HW5 60% Pass
Midterm exam (30%)	Q1, Q2 80% Pass		Q3, Q4 70% Pass		Q5 50%
Final exam (50%)		Q1, Q2 80% Pass		Q3, Q4 70% Pass	Q5 50%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

Date revised: January 12, 2022

Ho Chi Minh City, 12/01/2022
Dean of School of Industrial Engineering and
Management
(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
Department of Mathematics

COURSE SYLLABUS

Course Name: Calculus 3

Course Code: MA023IU

1. General information

<i>Course designation</i>	This course equip students with Complex numbers, complex series, complex functions, complex derivatives; Laplace transform, z-transform, Fourier series, Fourier transform, the inverse transform, transforms of derivatives and integrals, first-order differential equations, second-order differential equations, difference equations, applications to electrical circuits and signal processing.
<i>Semester(s) in which the course is taught</i>	1, 2
<i>Person responsible for the course</i>	
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lectures, assignments
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 170 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 50 (lectures) Private study including examination preparation, specified in hours ¹³ : 120
<i>Credit points</i>	4 (6.2 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Calculus 1 and Calculus 2

¹³ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<p><i>Course objectives</i></p>	<ol style="list-style-type: none"> 1. Knowledge of complex numbers and series, complex functions, and complex derivatives 2. Knowledge of Laplace transforms, z-transforms, Fourier series and Fourier transforms, Fourier spectrum, frequency response, etc 3. Mathematical and computational skills needed in solving differential equations and in fields such as electric circuits, communications, signal processing and control, etc 4. To develop confidence and fluency in discussing mathematics in English. 								
<p><i>Course learning outcomes</i></p>	<p>Upon the successful completion of this course students will be able to:</p> <table border="1"> <thead> <tr> <th>Competency level</th> <th>Course learning outcome (CLO)</th> </tr> </thead> <tbody> <tr> <td>Knowledge</td> <td> CLO1. Have basic knowledge of complex numbers and series, complex functions, and complex derivatives (Program outcomes: a) CLO2. Have basic knowledge of Laplace transforms, z-transforms, Fourier series and Fourier transforms, Fourier spectrum, frequency response (Program outcomes: a) </td> </tr> <tr> <td>Skill</td> <td> CLO3 Can do the Fourier and Laplace transform of basic functions in applications. CLO4. Can solve differential equations and in fields such as electric circuits, communications, signal processing and control, etc (Program outcomes: a, j) </td> </tr> <tr> <td>Attitude</td> <td> CLO5. To develop confidence and fluency in discussing and reading mathematics in English and to develop a long-life learning (Program outcome: j, k) </td> </tr> </tbody> </table>	Competency level	Course learning outcome (CLO)	Knowledge	CLO1. Have basic knowledge of complex numbers and series, complex functions, and complex derivatives (Program outcomes: a) CLO2. Have basic knowledge of Laplace transforms, z-transforms, Fourier series and Fourier transforms, Fourier spectrum, frequency response (Program outcomes: a)	Skill	CLO3 Can do the Fourier and Laplace transform of basic functions in applications. CLO4. Can solve differential equations and in fields such as electric circuits, communications, signal processing and control, etc (Program outcomes: a, j)	Attitude	CLO5. To develop confidence and fluency in discussing and reading mathematics in English and to develop a long-life learning (Program outcome: j, k)
Competency level	Course learning outcome (CLO)								
Knowledge	CLO1. Have basic knowledge of complex numbers and series, complex functions, and complex derivatives (Program outcomes: a) CLO2. Have basic knowledge of Laplace transforms, z-transforms, Fourier series and Fourier transforms, Fourier spectrum, frequency response (Program outcomes: a)								
Skill	CLO3 Can do the Fourier and Laplace transform of basic functions in applications. CLO4. Can solve differential equations and in fields such as electric circuits, communications, signal processing and control, etc (Program outcomes: a, j)								
Attitude	CLO5. To develop confidence and fluency in discussing and reading mathematics in English and to develop a long-life learning (Program outcome: j, k)								

<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (4 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	1.1 Introduction	1	I, T
	1.2 The Argand diagram		
	1.3 The arithmetic of complex numbers		
	1.4 Polar form of a complex number		
	1.5 Euler's formula	1	I, T
	1.6 Circular and hyperbolic functions		
	1.7 Logarithm of a complex number		
	1.8 Powers and roots of complex numbers		
	1.9 Complex functions and mappings	1	T, U
	1.10 Complex differentiation. Cauchy-Riemann equations		
1.11 Conjugate and harmonic functions			
1.12 Power series. Taylor series	1	T, U	
1.13 Laurent series			
2.1 Definition and examples	1	T, U	
2.2 Existence of the Laplace transform			
2.3 Properties of the Laplace transform			
2.4 The inverse transform			
2.5 Transforms of derivatives and integrals	1	T, U	
2.6 Differential equations			
2.7 Engineering applications.			
2.8 Step functions and Laplace transforms			
2.9 The second shift theorem	1	T, U	
2.10 Differential equations			
2.11 Periodic functions			
2.12 Impulse functions and Laplace transforms			
2.13 Relationship between Heaviside step and impulse functions	1	T, U	
2.14 Transfer functions. Stability. Impulse response			
2.15 Initial-and final value-theorems			
2.16 Convolution. System response to an arbitrary input			
2.17 Engineering applications.			
3.1 Definition and examples	1	T, U	
3.2 Properties of the z transform			

	3.3 The inverse z transform		
	3.4 Discrete-time systems and difference equations 3.5 z transfer functions 3.6 The impulse response. Stability	1	T, U
	3.7 Convolution 3.8 The relationship between Laplace and z transforms 3.9 Engineering applications	1	I, T
	4.1 Periodic functions. The Fourier coefficients 4.2 Functions of period 2π 4.3 Even and odd functions and harmonics 4.4 Linear property. Convergence of the Fourier series	1	I, T, U
	4.5 Functions of period T 4.6 Functions defined over a finite interval 4.7 Differentiation and integration of Fourier series. 4.8 Coefficients in terms of jumps at discontinuities	1	T, U
	4.9 Engineering applications 4.10 Complex form of Fourier series 4.11 The multiplication theorem and Parseval's theorem	1	T, U
	4.12 Discrete frequency spectra. Power spectrum 4.13 Engineering applications Exercises and Revisions.	1	T, U
<i>Examination forms</i>	Written examination		
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		

<i>Reading list</i>	<p>G. James, <i>Advanced Modern Engineering Mathematics</i>, 3rd ed., Prentice Hall, 2004. (Main textbook)</p> <p>Other textbooks:</p> <ol style="list-style-type: none"> 1. E. Kreyszig, <i>Advanced Engineering Mathematics</i>, 9th ed., John Wiley & Sons, 2006. 2. R.C. Drof, J. A. Svoboda, <i>Introduction to Electric Circuits</i>, 6th ed., John Weley & Sons, 2004. 3. J.W. Nilsson and S.A. Riedel, <i>Electric Circuits</i>, 7th Ed, Prentice Hall, 2005. 4. J.H. McClellan, R.W. Schafer, M.A, Yoder, <i>Signal Processing First</i>, Prentice Hall, 2003. 5. A.V. Oppenheim, A.S. Willsky, <i>Signals & Systems</i>, 2nd ed., Prentice Hall, 1997. 6. B.P. Lathi, <i>Linear Systems and Signals</i>, Oxford University Press, 2005.
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2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-5) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2	x						
3						x	
4						x	
5							x

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-5) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes									
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6	
1		1.2a,b	1.3d	2.1a,b	2.2a					

2		1.2a,b	1.3d	2.1a,b	2.2a				
3		1.2a	1.3d		2.2b		2.4b	2.5a	
4		1.2a	1.3d		2.2b		2.4b	2.5a	
5	1.1a,b, ,c		1.3c			2.3a	2.4c		

3. Planned learning activities and teaching methods

Week	Topics	CLO	Assessment	Teaching and Learning activities
1	Introduction, The Argand diagram, The arithmetic of complex numbers, Polar form of a complex number	1,3		Lecture
2	Euler's formula, Circular and hyperbolic functions, Logarithm of a complex number, Powers and roots of complex numbers	1,3	Quiz	Lectures and Quiz
3	Complex functions and mappings, Complex differentiation. Cauchy-Riemann equations, Conjugate and harmonic functions	3, 5	Quiz	Lectures and Quiz
4	Power series. Taylor series, Laurent series	3, 5	HW1	Lectures and HW
5	Definition and examples, Existence of the Laplace transform, Properties of the Laplace transform, The inverse transform	3, 5	Quiz	Lectures and Quiz
6	2.5 Transforms of derivatives and integrals 2.6 Differential equations 2.7 Engineering applications. 2.8 Step functions and Laplace transforms	3, 5	HW2	Lectures and HW
7	2.9 The second shift theorem 2.10 Differential equations 2.11 Periodic functions 2.12 Impulse functions and Laplace transforms	3, 5	Quiz	Lectures and Quiz
8	2.13 Relationship between Heaviside step and impulse functions 2.14 Transfer functions. Stability. Impulse response 2.15 Initial-and final value-theorems 2.16 Convolution. System response to an arbitrary input	3, 5	HW3	Lectures and HW

	2.17 Engineering applications.			
Midterm Exam				
9	3.1 Definition and examples 3.2 Properties of the z transform 3.3 The inverse z transform	2, 4	Quiz	Lectures and Quiz
10	3.4 Discrete-time systems and difference equations 3.5 z transfer functions 3.6 The impulse response. Stability	2, 4	Quiz	Lectures and Quiz
11	3.7 Convolution 3.8 The relationship between Laplace and z transforms 3.9 Engineering applications	4, 5	HW4	Lectures and HW
12	4.1 Periodic functions. The Fourier coefficients 4.2 Functions of period 2π 4.3 Even and odd functions and harmonics 4.4 Linear property. Convergence of the Fourier series	2, 4	Quiz	Lectures and Quiz
13	4.5 Functions of period T 4.6 Functions defined over a finite interval 4.7 Differentiation and integration of Fourier series. 4.8 Coefficients in terms of jumps at discontinuities	4, 5	Quiz	Lectures and Quiz
14	4.9 Engineering applications 4.10 Complex form of Fourier series 4.11 The multiplication theorem and Parseval's theorem	2, 4, 5	HW5	Lectures and HW
15	4.12 Discrete frequency spectra. Power spectrum 4.13 Engineering applications Revisions	1, 2, 3, 4	Exercises	
Final Exam		1, 2, 3, 4		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5

In-class exercises/ quizzes (10%)	Qz1->Qz4 80% Pass	Qz5->Qz8 80%Pass	Qz1->Qz4 80% Pass	Qz5->Qz8 80% Pass	Qz2, 4, 6, 8 70% Pass
Homework exercises (10%)	HW1->H3 70% Pass	HW4, HW5 70%	HW1->HW3 70% Pass	HW4, HW5 70%	HW1->HW5 60% Pass
Midterm exam (30%)	Q1, Q2 80% Pass		Q3, Q4 70% Pass		Q5 50%
Final exam (50%)		Q1, Q2 80%Pass		Q3, Q4 70%Pass	Q5 50%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Date revised: January 12, 2022

Ho Chi Minh City, 12/1/2022
Head of Department of Mathematics
(Signature)

Phạm Hữu Anh Ngọc



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
Department of Physics

COURSE SYLLABUS

Course Name: Physics 1 (General Mechanics)

Course Code: PH013IU

1. General information

<i>Course designation</i>	<i>This subject will provide an introduction to mechanics including: concepts and principles of kinetics, dynamics, energetics of motion of a particle and a rigid body.</i>
<i>Semester(s) in which the course is taught</i>	1, 2
<i>Person responsible for the course</i>	Assos. Prof. Phan Bảo Ngọc Dr. Phan Hiền Vũ
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson, assignment.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 85 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): lecture: 25 Private study including examination preparation, specified in hours ¹⁴ : 60
<i>Credit points</i>	2 (3.1 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None
<i>Course objectives</i>	This course will provide students with: <ol style="list-style-type: none">1. The basic knowledge of general Mechanics Physics2. Skills to solve problems in engineering environment by applying both theoretical and experimental techniques3. Understanding and skills needed to use physical laws governing real process and to solve them in the engineering environment4. Confidence and fluency in discussing physics in English.

¹⁴ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:		
	Competency level	Course learning outcome (CLO)	
	Knowledge	CLO1. Understand basic knowledge of kinematics, dynamics, and laws of conservation of a mechanical system. CLO2. Apply knowledge of physics to solving problems in science and engineering	
	Skill	CLO3. Apply skills to analyzing and solving problems in science and engineering	
	Attitude	CLO4. Communicate effectively in writing manner	
<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (2 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Chapter 1: Bases of Kinematics	2	I, T,U
	Chapter 2: The Law of Motion	2	I, T,U
	Chapter 3: Work and Mechanical Energy	3	I, T,U
	Chapter 4: Linear Momentum and Collisions	2	I, T,U
	Chapter 5: Rotation of a Rigid Object About a Fixed Axis	2	I, T,U
Chapter 6: Equilibrium and Elasticity	2	I	
Chapter 7: Universal Gravitation	2	I	
<i>Examination forms</i>	Short-answer questions		
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
<i>Reading list</i>	[1] Lecture Notes [2] Halliday D., Resnick R. and Walker, J. (2011) <i>Principles of Physics</i> , 9 th edition, John Willey and Sons, Inc. [3] Alonso M. and Finn E.J. (1992) <i>Physics</i> , Addison-Wesley Publishing Company. [4] Faughn/Serway (2006) <i>Serway's College Physics</i> , Thomson Brooks/Cole.		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2	x						

3						x	
4							x

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-4) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a,b	1.3d	2.1a,b	2.2a				
2		1.2a,b	1.3d	2.1a,b	2.2a				
3		1.2a	1.3d		2.2b		2.4b	2.5a	
4	1.1a,b, ,c		1.3c			2.3a	2.4c		

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1-3	Chapter 1: Basis of Kinematics Motion in One Dimension: - Position, Velocity, and Acceleration - One-Dimensional Motion with Constant Acceleration - Freely Falling Objects Motion in Two Dimensions: - Position, Velocity, and Acceleration Vectors - Two-Dimensional Motion with Constant Acceleration. Projectile Motion - Circular Motion. Tangential and Radial Acceleration - Relative Velocity and Relative Acceleration	1	Assignment/Quiz Midterm	Lecture, Discussion, Inclass-Quiz	[1] 1 [2] 1, 2, 3, 4
4-7	Chapter 2: Laws of Motion	1	Assignment//Quiz Midterm	Lecture, Discussion, Inclass-Quiz	[1] 2 [2] 5, 6

	<ul style="list-style-type: none"> - Newton's First Law and Inertial Frames - Newton's Second Law - Newton's Third Law <p>Some Applications of Newton's Laws:</p> <ul style="list-style-type: none"> - Gravitational Force and Weight - Forces of Friction - Uniform Circular Motion and Non-uniform Circular Motion - Motion in the Presence of Resistive Forces - Motion in Accelerated Frames 				
8	<p>Chapter 3: Work and Mechanical Energy</p> <ul style="list-style-type: none"> - Work Done by Force. Power - Kinetic Energy and Work. Kinetic Energy Theorem 	3	Assignment//Quiz Final	Lecture, Discussion, Inclass-Quiz	[1] 3 [2] 7, 8
Midterm					
9	<ul style="list-style-type: none"> - Potential Energy of a System - Conservation of Mechanical Energy - Conservative and Non-conservative Forces - Changes in Mechanical Energy for Non-conservative Forces - Relationship Between Conservative Forces and Potential Energy 			Lecture, Discussion, Inclass-Quiz	
10-11	<p>Chapter 4: Linear Momentum and Collisions</p> <ul style="list-style-type: none"> - Linear Momentum and Its Conservation - Impulse and Momentum - Collisions in One Dimension and Two Dimensions 		Assignment//Quiz Final	Lecture, Discussion, Inclass-Quiz	[1] 4 [2] 9
12-14	<p>Chapter 5: Rotation of a Rigid Object About a Fixed Axis</p> <ul style="list-style-type: none"> - Rotational Kinematics. Rotational Motion with Constant Angular Acceleration - Torque and Angular Acceleration - Moments of Inertia - Rotational Kinetic Energy - Rolling Motion of a Rigid Object - Angular Momentum of a Rotating Rigid Object - Conservation of Angular Momentum 	3	Assignment//Quiz Final	Lecture, Discussion, Inclass-Quiz	[1] 5 [2] 10, 11
15	<p>Chapter 6: Equilibrium and Elasticity</p> <p>The Conditions for Equilibrium The Center of Gravity</p> <p>Chapter 7: Universal Gravitation</p> <p>Newton's Law of Gravitation Kepler's Laws and the Motion of</p>	3	Assignment//Quiz Final	Lecture, Discussion, Inclass-Quiz	[1] 6, 7 [2] 12, 13

	Planets The Gravitational Field and Gravitational and Potential Energy				
	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class exercises/quizzes (10%)	Quiz1 60% Pass	Quiz2 60% Pass		Quiz3 60% Pass
Homework exercises (20%)	HW2 50% Pass		HW1, HW3, HW4 50% Pass	
Midterm exam (30%)		Q3 50% Pass	Q1, Q2 50% Pass	
Final exam (40%)	Part I 50% Pass		Part II.1,2 50% Pass	Part II.3 50% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:		HW/Assignment:	
Date:		Evaluator:	
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: This rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: December 27, 2022

Ho Chi Minh City, 27/12/2022
Chair of Department of Physics

Phan Bảo Ngọc



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
Department of Physics

COURSE SYLLABUS

Course Name: Physics 2

(Fluid Mechanics and Thermal Physics)

Course Code: **PH014IU**

1. General information

<i>Course designation</i>	<i>This subject will provide a basic knowledge of fluid mechanics; macroscopic description of gases; heat and the first law of thermodynamics; heat engines and the second law of thermodynamics; microscopic description of gases and the kinetic theory of gases.</i>
<i>Semester(s) in which the course is taught</i>	1, 2
<i>Person responsible for the course</i>	Assos. Prof. Phan Bảo Ngọc Dr. Phan Hiền Vũ
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson, assignment.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 85 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): lecture: 25 Private study including examination preparation, specified in hours ¹⁵ : 60
<i>Credit points</i>	2 (3.1 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None

¹⁵ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	<p>This course will provide students with:</p> <ol style="list-style-type: none"> 1. The basic knowledge of Fluid Mechanics and Thermal Physics 2. Skills to solve problems in engineering environment by applying both theoretical and experimental techniques 3. Understanding and skills needed to use physical laws governing real process and to solve them in the engineering environment 4. Confidence and fluency in discussing physics in English. 																	
<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:																	
	Competency level	Course learning outcome (CLO)																
	Knowledge	<p>CLO1. Understand basic knowledge of fluid mechanics, laws of thermodynamics, and the kinetic theory of an ideal gas.</p> <p>CLO2. Apply knowledge of physics to solving problems in science and engineering</p>																
	Skill	CLO3. Apply skills to analyzing and solving problems in science and engineering																
	Attitude	CLO4. Communicate effectively in writing manner																
<i>Content</i>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (2 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Chapter 1: Fluid Mechanics</td> <td>2</td> <td>I, T,U</td> </tr> <tr> <td>Chapter 2: Temperature, Heat, and the First Law of Thermodynamics</td> <td>4</td> <td>I, T,U</td> </tr> <tr> <td>Chapter 3: The Kinetic Theory of Gases</td> <td>5</td> <td>I, T,U</td> </tr> <tr> <td>Chapter 4: Entropy and the Second Law of Thermodynamics</td> <td>4</td> <td>I, T,U</td> </tr> </tbody> </table>			Topic	Weight	Level	Chapter 1: Fluid Mechanics	2	I, T,U	Chapter 2: Temperature, Heat, and the First Law of Thermodynamics	4	I, T,U	Chapter 3: The Kinetic Theory of Gases	5	I, T,U	Chapter 4: Entropy and the Second Law of Thermodynamics	4	I, T,U
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<i>Examination forms</i>	Short-answer questions																	
<i>Study and examination requirements</i>	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>																	
<i>Reading list</i>	<p>[1] Lecture Notes</p> <p>[2] Halliday D., Resnick R. and Walker, J. (2011) <i>Principles of Physics</i>, 9th edition, John Willey and Sons, Inc.</p> <p>[3] Alonso M. and Finn E.J. (1992) <i>Physics</i>, Addison-Wesley Publishing Company.</p> <p>[4] Faughn/Serway (2006) <i>Serway's College Physics</i>, Thomson Brooks/Cole.</p>																	

2. Learning Outcomes Matrix (optional)

7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2	x						
3						x	
4							x

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-4) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a,b	1.3d	2.1a,b	2.2a				
2		1.2a,b	1.3d	2.1a,b	2.2a				
3		1.2a	1.3d		2.2b		2.4b	2.5a	
4	1.1a,b,c		1.3c			2.3a	2.4c		

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1-2	Chapter 1: Fluid Mechanics - Fluids at Rest - Ideal Fluids in Motion - Bernoulli's Equation	1, 2	Assignment//Quiz Midterm	Lecture, Discussion, Inclass-Quiz	[1] 1 [2] 14
3-8	Chapter 2: Temperature, Heat, and First Law of Thermodynamics - Temperature and Zero th Law of Thermodynamics - Thermal Expansion - Heat and Absorption of Heat by Solids and Liquids - Work and Heat in Thermodynamic Processes - First Law of Thermodynamics and Its Some Special Cases - Heat Transfer Mechanisms	1, 2	Assignment//Quiz Midterm	Lecture, Discussion, Inclass-Quiz	[1] 2 [2] 18

Midterm					
9-12	Chapter 3: Kinetic Theory of Gases - Ideal Gases: Experimental Laws, Equation of State - Molecular Model of an Ideal Gas. Mean Free Path - Boltzmann Distribution Law and Distribution of Molecular Speeds - Molar Specific Heats of an Ideal Gas - Equipartition of Energy Theorem - Adiabatic Expansion of an Ideal Gas	3, 4	Assignment//Quiz Final	Lecture, Discussion, Inclass-Quiz	[1] 2 [2] 19
13-15	Chapter 4: Entropy and Second Law of Thermodynamics - Reversible, Irreversible Processes and Entropy - Second Law of Thermodynamics - Entropy in Real World: Engines - A Statistical View of Entropy	3, 4	Assignment//Quiz Final	Lecture, Discussion, Inclass-Quiz	[1] 4 [2] 20
Final exam					

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class exercises/quizzes (10%)	Qz1 60% Pass	Qz2 60% Pass		Qz3 60% Pass
Homework exercises (20%)	HW2 50% Pass		HW1, HW3, HW4 50% Pass	
Midterm exam (30%)		Q3 50% Pass	Q1, Q2 50% Pass	
Final exam (40%)	Part I 50% Pass		Part II.1,2 50% Pass	Part II.3 50% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		

Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: This rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: December 27, 2022

Ho Chi Minh City, 27/12/2022
Chair of Department of Physics

Phan Bảo Ngọc



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
Department of Physics

COURSE SYLLABUS

Course Name: Physics 3 (Electricity and Magnetism)

Course Code: PH015IU

1. General information

<i>Course designation</i>	<i>This subject will provide a basic knowledge of electricity and magnetism.</i>
<i>Semester(s) in which the course is taught</i>	1, 2
<i>Person responsible for the course</i>	Assoc. Prof. Phan Bảo Ngọc
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson, assignment.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): lecture: 37.5 Private study including examination preparation, specified in hours ¹⁶ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Physics 1

¹⁶ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	<p>This course will provide students with:</p> <ol style="list-style-type: none"> 1. The basic knowledge of electricity and magnetism such as electric charge, electric potential, magnetic fields, electromagnetic waves, etc. 2. Skills to solve problems in engineering environment by applying both theoretical and experimental techniques. 3. Understanding and skills needed to use physical laws governing real process and to solve them in the engineering environment. 4. Confidence and fluency in discussing physics in English. 																								
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<i>Examination forms</i>	Short-answer questions																								
<i>Study and examination requirements</i>	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>																								
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2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2	x						
3						x	
4							x

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
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7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-4) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a,b	1.3d	2.1a,b	2.2a				
2		1.2a,b	1.3d	2.1a,b	2.2a				
3		1.2a	1.3d		2.2b		2.4b	2.5a	
4	1.1a,b, c		1.3c			2.3a	2.4c		

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1-3	Chapter 1: Electric Fields	1, 2, 3, 4	Quiz 1/ Assignment Midterm exam	Lecture, Discussion	[1].0. [2].1.
4-5	Chapter 2: Electric Potential and Capacitance	1, 2, 3, 4	Quiz 2/ Assignment Midterm exam	Lecture, Discussion	[1].9.
6-7	Chapter 3: Current and Resistance. Direct Current Circuits	1, 2, 3, 4	Assignment Midterm exam	Lecture, Discussion	[2].2.
8	Chapter 4: Magnetism (Part 1)	1, 2, 3, 4	Assignment Final exam	Lecture, Discussion	[2]. 4. [1]. 18.

9-10	Midterm				
11-12	Chapter 4: Magnetism (Part 2)	1, 2, 3, 4	Quiz 3/ Assignment Final exam	Lecture, Discussion	[2]. 4. [1]. 18.
13-14	Chapter 5: Electromagnetic Induction	1, 2, 3, 4	Quiz 4/ Assignment Final exam	Lecture, Discussion	[3]. 10
15-16	Chapter 6: Electromagnetic Oscillations and Alternating Current	1, 2, 3, 4	Assignment Final exam	Lecture, Discussion	[2]. 4. [1]. 18.
17	Chapter 7: Maxwell's Equation and Electromagnetic Waves	1, 2, 3, 4	Final exam	Lecture	[3]. 10
18-19	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Attendance + Homework + in-class discussion (15%)				
Quizzes (Qz) / assignment (As) (15%)	Qz1, Qz3/ As.P1 50%Pass	Qz2, Qz4/ As.P2 50%Pass	Qz1, Qz2, Qz3, Qz4 / As.P3 50%Pass	Qz1, Qz2, Qz3, Qz4 / As.P4 50%Pass
Midterm exam (30%)	Q1, Q2, Q3 50%Pass	Q4, Q5 50%Pass	Q3, Q5 50%Pass	Q3, Q5 50%Pass
Final exam (40%)	Q1, Q2, Q3 50%Pass	Q4, Q5 50%Pass	Q3, Q5 50%Pass	Q3, Q5 50%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
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1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: This rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
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Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1

Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: December 27, 2022

Ho Chi Minh City, 27/12/2022
Chair of Department of Physics

Phan Bảo Ngọc



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
Department of Mathematics

COURSE SYLLABUS

Course Name: Applied Linear Algebra

Course Code: MA027IU

1. General information

<i>Course designation</i>	The course provides the student with basic knowledge of linear algebra.
<i>Semester(s) in which the course is taught</i>	1, 2
<i>Person responsible for the course</i>	
<i>Language</i>	English
<i>Relation to curriculum</i>	
<i>Teaching methods</i>	Lectures, assignments
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 85 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 25 (lectures) Private study including examination preparation, specified in hours ¹⁷ : 60
<i>Credit points</i>	2 (3.1 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None
<i>Course objectives</i>	1. To provide students basic knowledge of linear systems, and methods of solving them: Gaussian elimination and Cramer's rule 2. Introduction to abstract vector spaces and eigenvalues/eigenvectors

¹⁷ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:		
	Competency level	Course learning outcome (CLO)	
	Knowledge	CLO1. Have basic knowledge of linear system and the methods of solving them. CLO2. Understand abstract vector spaces and eigenvalues/eigenvectors	
	Skill	CLO3. Can solve linear systems using Gaussian elimination or determinants CLO4. Understand linear operators on abstract vector spaces and can find their eigenvalues/eigenvectors	
Attitude	CLO5. Confident when applying linear algebra in suitable practical situations.		
<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (4 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Introduction to linear systems and matrices, Gauss elimination	1	I, T, U
	The algebra of matrices, Inverse matrices, Transpose matrix	1	T, U
	Determinant	1	T
	Evaluation of Determinants using Elementary Operations,	1	T, U
	Properties of Determinants	1	T, U
	Cofactor formula, Cramer's Rule	1	T, U
	Euclidean n-spaces, General vector spaces	1	T, U
	Subspaces, span, null spaces	1	T, U
	Linear independence	1	T, U
	Basis and Dimension	1	T, U
	Rank of a matrix	1	I, T
Linear transformation	1	I, T, U	
Inner product spaces	1	T, U	
Eigenvalues and eigenvectors	1	T, U	
Diagonalization	1	T, U	
<i>Examination forms</i>	Written examination		
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		

<i>Reading list</i>	<p>1. E. Kreyszig, Advanced Engineering Mathematics, 10th edition, John Wiley & Sons, 2011.</p> <p>2. B. Kolman and David R. Hill, Elementary linear algebra with applications (9th edition)</p>
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2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-5) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2	x						
3						x	
4						x	
5							x

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-5) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a,b	1.3d	2.1a,b	2.2a				
2		1.2a,b	1.3d	2.1a,b	2.2a				
3		1.2a	1.3d		2.2b		2.4b	2.5a	
4		1.2a	1.3d		2.2b		2.4b	2.5a	
5	1.1a,b,c		1.3c			2.3a	2.4c		

3. Planned learning activities and teaching methods

Week	Topics	CLO	Assessment	Teaching and Learning activities

1	Introduction to linear systems and mat Gauss elimination	1,3		Lectures
2	The algebra of matrices, Inverse matri Transpose matrices	1,3	Quiz	Lectures and Quiz
3	Determinant	3, 5	Quiz	Lectures and Quiz
4	Evaluation of Determinants using Elementary Operations,	3, 5	HW1	Lectures and HW
5	Properties of Determinants	3, 5	Quiz	Lectures and Quiz
6	Cofactor formula, Cramer's Rule	3, 5	HW2	Lectures and HW
7	Euclidean n-spaces, General vector spaces	3, 5	Quiz	Lectures and Quiz
8	Subspaces, span, null spaces	3, 5	HW3	Lectures and HW
Midterm Exam				
9	Linear independence	2, 4	Quiz	Lectures and Quiz
10	Basis and Dimension	2, 4	Quiz	Lectures and Quiz
11	Rank of a matrix	4, 5	HW4	Lectures and HW
12	Linear transformation	2, 4	Quiz	Lectures and Quiz
13	Inner product spaces	4, 5	Quiz	Lectures and Quiz
14	Eigenvalues and eigenvectors	2, 4, 5	HW5	Lectures and HW
15	Diagonalization	1, 2, 3, 4, 5	Exercises	
Final Exam		1, 2, 3, 4, 5		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
In-class exercises/ quizzes (10%)	Qz1->Qz4 80% Pass	Qz5->Qz8 80% Pass	Qz1->Qz4 80% Pass	Qz5->Qz8 80% Pass	Qz2, 4, 6, 8 70% Pass
Homework exercises (10%)	HW1->H3 70% Pass	HW4, HW5 70%	HW1->HW3 70% Pass	HW4, HW5 70%	HW1->HW5 60% Pass
Midterm exam (30%)	Q1, Q2 80% Pass		Q3, Q4 70% Pass		Q5 50%
Final exam (50%)		Q1, Q2 80% Pass		Q3, Q4 70% Pass	Q5 50%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Date revised: January 12, 2022

Ho Chi Minh City, 12/01/2022
Dean of School of Industrial Engineering and
Management
(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Biotechnology

COURSE SYLLABUS

Course Name: Chemistry for Engineers

Course Code: CHE011IU

1. General information

<i>Course designation</i>	<i>This one-semester course is designed for students who are pursuing an engineering degree (e.g., information technology, biotechnology, civil, biomedical, electronic, and telecommunication engineering) and chemistry-related ones (e.g., applied chemistry and chemical engineering). The course will introduce the basic principles of chemistry and connect those principles to issues in the engineering profession. The related lab work is not included in this course.</i>
<i>Semester(s) in which the course is taught</i>	1, 2, and summer (optional)
<i>Person responsible for the course</i>	Assoc.Prof. Dr. Huynh Kim Lam Dr. Vũ Bảo Khánh Dr. Phùng Thanh Khoa
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, project, and seminar (optional).
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 hrs for lectures Private study including examination preparation, specified in hours ¹⁸ : 100 hrs
<i>Credit points</i>	03 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	

¹⁸ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	<p>Upon successful completion of this course, the students should be able to demonstrate knowledge of:</p> <ul style="list-style-type: none"> ● The role of chemistry for engineers ● Measurements in chemistry ● Matter and state of matter ● Structure of atoms, molecules and ions ● Periodicity ● Chemical bonds ● Intermolecular forces, liquid and solid ● Gases, liquids, solids and their properties ● Types and rates of chemical reactions ● Chemical equilibrium ● Electrolytes, acid-base, <i>pH</i>, buffer ● Thermochemistry and thermodynamics
<i>Course learning outcomes</i>	<p>CLO1: Be able to apply mathematics and science knowledge to solve chemistry-related problems and explain many aspects of everyday life using chemistry concepts.</p> <p>CLO2: Be able to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.</p> <p>CLO3: Be able to acquire and apply new knowledge as needed, using appropriate learning strategies.</p>

<p><i>Content</i></p>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (3 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Introduction to General Chemistry for Engineers</td> <td>0.2</td> <td>I, T</td> </tr> <tr> <td>Introduction to Matter</td> <td>0.3</td> <td>I, T</td> </tr> <tr> <td>Measurements in Chemistry</td> <td>0.5</td> <td>I, T</td> </tr> <tr> <td>Atoms, Molecules and Ions</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Periodicity</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Chemical Bonds</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Intermolecular Forces</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Gases and Their Properties</td> <td>0.5</td> <td>I, T</td> </tr> <tr> <td>Solutions and Their Properties</td> <td>0.5</td> <td>I, T</td> </tr> <tr> <td>Solids and Their Properties</td> <td>0.5</td> <td>I, T</td> </tr> <tr> <td>Chemical Reactions</td> <td>0.5</td> <td>I, T</td> </tr> <tr> <td>Chemical Kinetics</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Chemical Equilibrium</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Electrolytes, Acid- Base, pH and Buffer</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Thermochemistry and Thermodynamics</td> <td>2</td> <td>I, T</td> </tr> </tbody> </table>	Topic	Weight	Level	Introduction to General Chemistry for Engineers	0.2	I, T	Introduction to Matter	0.3	I, T	Measurements in Chemistry	0.5	I, T	Atoms, Molecules and Ions	1	I, T	Periodicity	1	I, T	Chemical Bonds	2	I, T	Intermolecular Forces	1	I, T	Gases and Their Properties	0.5	I, T	Solutions and Their Properties	0.5	I, T	Solids and Their Properties	0.5	I, T	Chemical Reactions	0.5	I, T	Chemical Kinetics	1	I, T	Chemical Equilibrium	1	I, T	Electrolytes, Acid- Base, pH and Buffer	2	I, T	Thermochemistry and Thermodynamics	2	I, T
Topic	Weight	Level																																															
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Electrolytes, Acid- Base, pH and Buffer	2	I, T																																															
Thermochemistry and Thermodynamics	2	I, T																																															
<p><i>Examination forms</i></p>	<p>Multiple-choice questions, written test</p>																																																
<p><i>Study and examination requirements</i></p>	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>																																																
<p><i>Reading list</i></p>	<p>[1] “Chemistry: A Molecular Approach” by Nivaldo J. Tro (2nd Ed., 2008). Pearson.</p> <p>[2] “General Chemistry” by Darrell Ebbing and Steven D. Gammon (9th Ed., 2010). Brooks/Cole, USA.</p> <p>[3] “Chemistry for Engineers – An Applied Approach” by Mary Jane Shultz (2007). Houghton Mifflin.</p> <p>[4] “Chemistry, Principles and Reactions” by Masterton and Hurley (6th Ed., 2009). Cengage learning, USA.</p>																																																

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2						x	
3							x

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a,b	1.3d	2.1a,b	2.2a				
2		1.2a	1.3d		2.2b		2.4b	2.5a	
3	1.1a,b,c		1.3c			2.3a	2.4c		

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities
1	Introduction to General Chemistry for Engineers Introduction to Matter Measurements in Chemistry	1		- Lecture - Class discussion
2	Atoms, Molecules and Ions	1,7	Homework/ Quiz	- Lecture - Class discussion
3	Periodicity	1,7	Homework/ Quiz	- Lecture - Class discussion
4, 5	Chemical Bonds	1,7	Homework/ Quiz	- Lecture - Class discussion
6	Intermolecular Forces	2,7	Homework/ Quiz	- Lecture - Class discussion

7	Gases and Their Properties Solutions and Their Properties	2,7	Homework/ Quiz	- Lecture - Class discussion
8	Solids and Their Properties Chemical Reactions	1,2, 7	Homework/ Quiz	- Lecture - Class discussion
9-10	Midterm			
11, 12	Chemical Kinetics and Chemical Equilibrium	1,2, 7	Homework/ Quiz	- Lecture - Class discussion
13, 14	Electrolytes, Acid-Base, <i>pH</i> and Buffer	1,2, 7	Homework/ Quiz	- Lecture - Class discussion
15, 16	Thermochemistry and Thermodynamics	1,2, 7	Homework/ Quiz	- Lecture - Class discussion
17	Revision	1,2, 7	Homework/ Quiz	- Class discussion
18- 20	Final exam			

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
In-class exercises/homework/quizzes (30%)	Qz1, 2, 3, 4, 5 50% Pass	Qz1, 2, 3, 4, 5 50% Pass	Homework 50% Pass
Midterm exam (30%)	Part I 50% Pass	Part II.1 50% Pass	Part II.2 50% Pass
Final exam (40%)	Part I 50% Pass	Part II.1 50% Pass	Part II.2 50% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Date revised: August 10, 2022

Ho Chi Minh City, 10/08/2022
Dean of School of Industrial Engineering
and Management
(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Biotechnology

COURSE SYLLABUS

Course Name: Chemistry Laboratory

Course Code: CH012IU

1. General information

<i>Course designation</i>	This one-semester course is designed for engineering students those who are pursuing a nonchemistry engineering degree such as information technology, biotechnology, civil, biomedical, electronic and telecommunication engineering. The course will introduce students to basic laboratory safety, techniques and apparatus, and complement the information gained in lecture. Prior to each lab, students must read the lab manual about the experiment and complete a prelaboratory report. All students must complete mandatory safety training to participate in the course, which will be provided at the first day of the class. Students are expected to come to each lab on time and be prepared to carry out the day's tasks.
<i>Semester(s) in which the course is taught</i>	1, 2, and summer (optional)
<i>Person responsible for the course</i>	
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lab, Lecture
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 50 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 12.5 for lab, 5h for lecture Private study including examination preparation, specified in hours ¹⁹ : 37.5
<i>Credit points</i>	1 (1.8 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None

¹⁹ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	To introduce students to general chemistry laboratory and to provide students with a firm foundation in chemistry laboratory for careers in science and engineering		
<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:		
	Competency level	Course learning outcome (CLO)	
	Knowledge	CLO1: Applying chemical concepts to draw logical conclusions about the applicability of data to real world problems.	
	Skill	CLO2. Being able to perform lab-work: perform experiment, analyze data, answer questions, make conclusion, research assignments, report writing. CLO3: Using collected data to calculate physical or chemical quantities to the experiment being performed.	
Attitude	CLO4: Developing teamwork skills that include not only the efficient acquisition of experimental data, but also the awareness of safety in the laboratory setting.		
<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (5 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Chemical Reactions	1	T, U
	pH and buffers	1	T, U
	Redox titration	1	T, U
Chemical Equilibrium	1	T, U	
Factors affecting reaction rate	1	T, U	
<i>Final evaluation</i>	Multiple choice questions		
<i>Study and examination requirements</i>	Attendance: An attendance of 100 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
<i>Reading list</i>	[1] Lab manual for chemistry laboratory (internal use only)		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2						x	
3							x
4							x

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-4) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a,b	1.3d	2.1a,b	2.2a				
2		1.2a	1.3d		2.2b		2.4b	2.5a	
3	1.1a,b, ,c		1.3c			2.3a	2.4c		
4	1.1a,b, ,c		1.3c			2.3a	2.4c		

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Orientations		Pre-lab Experiment performance Report	Short lecture Experiment Class discussion	
2	Chemical Reactions	1-4	Pre-lab Experiment performance Report	Short lecture Experiment Class discussion	
3	pH and buffers	1-4	Pre-lab Experiment performance Report	Short lecture Experiment Class discussion	
4	Redox titration	1-4	Pre-lab Experiment performance Report	Short lecture Experiment Class discussion	
5	Chemical Equilibrium	1-4	Pre-lab Experiment performance Report	Short lecture Experiment Class discussion	

6	Factors affecting reaction rate	1-4	Pre-lab Experiment performance Report	Short lecture Experiment Class discussion
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4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class exercises/pre-lab (10%)		Prelab 1, 2, 3, 4, 5 50%Pass	Prelab 1, 2, 3, 4, 5 50%Pass	
Lab report (60%)	Report 1, 2, 3, 4, 5 50%Pass	Report 1, 2, 3, 4, 5 50%Pass	Report 1, 2, 3, 4, 5 50%Pass	Report 1, 2, 3, 4, 5 50%Pass
Final exam (30%)	Q1 50%Pass	Q2 50%Pass	Q3 50%Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content			
Introduction demonstrates thorough knowledge of relevant background and prior work			
Analysis and discussion demonstrate good subject mastery			
Summary and conclusions appropriate and complete			
Organization (10%)			
Distinct introduction, body, conclusions			
Content clearly and logically organized, good transitions			
Presentation (20%)			
Correct spelling, grammar, and syntax			
Clear and easy to read			
Quality of Layout and Graphics (10%)			
TOTAL SCORE			

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: This rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.

Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: August 10, 2022

Ho Chi Minh City, 10/08/2022

**Dean of School of Industrial Engineering and Management
(Signature)**

Dr. Nguyen Van Hop



**VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY**
Department of Civil Engineering

COURSE SYLLABUS

Course Name: Engineering Ethics and Professional Skills

Course Code: PE020IU

1. General Information

<i>Module designation</i>	PE020IU – Engineering Ethics and Professional Skills This course is designed to introduce engineering students to the concepts, theory and practice of engineering ethics. It will allow students to explore the relationship between ethics and engineering, and apply classical moral theory and decision making for engineering issues encountered in academic and professional careers. This course also provides students with the professional skills: sharing ideas and concepts, team working, and presentation skills.
<i>Semester(s) in which the module is taught</i>	3
<i>Person responsible for the module</i>	Dr. Nguyen, Hoai Nghia, Dr. Huynh, Vo Trung Dung
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, presentation, and assignments.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 Private study including examination preparation, specified in hours ²⁰ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the module</i>	None
<i>Course objectives</i>	Overall objectives are to equip IU students with knowledge about the philosophies of ethics, professional practice, and world culture. Students who complete the course will be able to perform the following tasks:

²⁰ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

	<p>(1) Having knowledge of the definition of engineering ethics, codes of ethics, ethic philosophies, intellectual property, copyright, and fair use of copyrighted materials and research data.</p> <p>(2) Using different problem-solving techniques to solve ethical dilemmas.</p> <p>(3) Analyzing social, environmental, legal aspects, safety and sustainability issues of engineering activities.</p>
--	--

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO1. Having knowledge of the definition of engineering ethics, codes of ethics, ethic philosophies, intellectual property, copyright, and fair use of copyrighted materials and research data.
	Skill	CLO2. Using different problem-solving techniques to solve ethical dilemmas.
	Attitude	CLO3. Analyzing social, environmental, legal aspects, safety and sustainability issues of engineering activities.

<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (3 hours)		
	Teaching levels: I (Introduce); T (teach); U (Utilize)		
	Topic	Weight	Level
	Introduction to engineering professionalism and ethics	1	I
	Engineers in Society	1	T, U
	Moral choices and codes of ethics	1	T, U
	Philosophical ethics	2	I, T, U
	Ethical problem-solving techniques	1	T, U
	Engineers at the Workplaces - Leadership	2	T, U
	Truth in actions and words Academic and Research Ethics	1	T
	Commitment to Safety	1	T, U
	Internet ethics, Privacy Issues and Intellectual Property Rights	1	T, U
Environmental ethics Sustainable engineering	1	T	
Review	1	T	

<i>Examination forms</i>	Constructed-response test
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed based on their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this module.
<i>Reading list</i>	Textbook: [1] M. W. Martin and R. Schinzinger (2010). <i>Introduction to engineering ethics</i> McGraw-Hill Education 2 nd edition [2] C. B. Fleddermann. (2011). <i>Engineering Ethics</i> , Pearson 4th edition

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1			x				
2				x			
3					x		

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1c		1.3a						2.6a
2	1.1b		1.3c					2.5b	2.6b
3	1.1c		1.3b						2.6a

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to engineering professionalism and ethics	1		Lecture, Discussion	[1] Chapter 1

2	Engineers in Society	1	HW1 and/or Quiz1	Lecture, HW1 and/or Quiz1	[1] Chapter 4
3	Moral choices and codes of ethics	1	Presentation1	Lecture, Presentation1	[1] Chapter 2
4, 5	Philosophical ethics	1, 2	HW2 and/or Quiz2	Lecture, HW2 and/or Quiz2	[1] Chapter 3
6	Ethical problem-solving techniques	2	Presentation2, HW3 and/or Quiz3	Lecture, HW3 and/or Quiz3	[4] Chapter 4
7, 8	Engineers at the Workplaces - Leadership	1	Quiz4	Lecture, Discussion Quiz4	[1] Chapter 6
9-10	MIDTERM EXAM				
11-12	Truth in actions and words Academic and Research Ethics	1, 3	Quiz5	Lecture, Quiz5	[1] Chapter 7
13	Commitment to Safety	1, 3	Quiz6	Lecture, Discussion Quiz6	[1] Chapters 5, 6
14-15	Internet Ethics Privacy Issues and Intellectual Property Rights	1, 3	Quiz7	Lecture, Discussion Quiz7	[1] Chapter 13
16	Environmental ethics Sustainable engineering	1, 3	Quiz8	Lecture, Discussion Quiz8	[1] Chapter 9
17	Review				
18-19	FINAL EXAM				

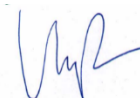
4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
In-class exercises/quizzes (10%)	Qz1, Qz4, 50% Pass	Qz2, Qz3 50% Pass	Qz5, Qz6, Qz7, Qz8, 50% Pass
Homework exercises/Presentation (20%)	Presentation 1 50% Pass	Presentation 2 50% Pass	
Midterm exam (20%)	MCQ, Case study 50% Pass	MCQ, Case study 50% Pass	
Final exam (50%)			MCQ, Case study 50% Pass

Note: %Pass: % students have scores greater than 50 out of 100.

5. Date revised: August 01, 2022

Ho Chi Minh City, 01/08/2022
Dean of School of Industrial Engineering and Management
(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
Department of Environmental Engineering

COURSE SYLLABUS

Course Name: Environmental Science

Course Code: **PE014IU**

1. General information

<i>Course designation</i>	This course provides the basic knowledge about environmental science; population growth and utilization of natural resources and the environment; natural resources and current exploitation; pollution and its impacts, environmental economic and sustainable development. It also aims to raise students' awareness about possible impacts of human activities on the environment and natural resources in order to apply relevant economic practices.
<i>Semester(s) in which the course is taught</i>	1,2,3
<i>Person responsible for the course</i>	Dr. Tran Thanh Tu Dr. Nguyen Thi Hoang Hai MSc. Bui Xuan Anh Dao MSc. Nguyen Thi Hong Lan Assoc. Prof. Pham Thi Hoa Assoc. Prof. Pham Ngoc
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson, homework, presentation
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 Private study including examination preparation, specified in hours ²¹ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None

²¹ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	Students will be provided with the knowledge about environmental science; population growth and utilization of natural resources and the environment; natural resources and current exploitation; pollution and its impacts, environmental economic and sustainable development. Through this unit, students will be more aware of possible impacts of human activities on the environment and natural resources to apply relevant economic practices.																																			
<i>Course learning outcomes</i>	<p>Upon the successful completion of this course students will be able to:</p> <table border="1"> <thead> <tr> <th>Competency level</th> <th colspan="2">Course learning outcome (CLO)</th> </tr> </thead> <tbody> <tr> <td>Knowledge</td> <td colspan="2"> CLO1. Recognize the current environmental issues and the roles of ecosystem and biodiversity. CLO2. Explain the growth of human population and its impacts to the ecosystem, biodiversity and the environment. CLO3. Describe the impacts of food, soil, and pest management, principles of water resources and water pollution, energy consumption and its impacts to the environment. CLO4. Identify the problems related to air pollution, climate disruption, and ozone depletion as well as environmental economics, politics, and environmental worldviews. </td> </tr> <tr> <td>Skill</td> <td colspan="2">CLO5. Describes the issues related to ecosystem, biodiversity, human population growth, foot management, water and energy consumption, environmental pollution, climate change, etc. via in-class presentation.</td> </tr> <tr> <td>Attitude</td> <td colspan="2">CLO6. Discuss the impacts of human activities to the ecosystem, biodiversity and the environment.</td> </tr> </tbody> </table>			Competency level	Course learning outcome (CLO)		Knowledge	CLO1. Recognize the current environmental issues and the roles of ecosystem and biodiversity. CLO2. Explain the growth of human population and its impacts to the ecosystem, biodiversity and the environment. CLO3. Describe the impacts of food, soil, and pest management, principles of water resources and water pollution, energy consumption and its impacts to the environment. CLO4. Identify the problems related to air pollution, climate disruption, and ozone depletion as well as environmental economics, politics, and environmental worldviews.		Skill	CLO5. Describes the issues related to ecosystem, biodiversity, human population growth, foot management, water and energy consumption, environmental pollution, climate change, etc. via in-class presentation.		Attitude	CLO6. Discuss the impacts of human activities to the ecosystem, biodiversity and the environment.																						
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<i>Examination forms</i>	Multiple-choice questions, presentation																																			

<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
<i>Reading list</i>	[1] Miller T.G. and Spoolman S.E., <i>Environmental Science</i> , 15 th edition, Cengage Learning Publisher, USA, 2015.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-6) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2		x					
3				x			
4					x		
5						x	
6							x

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

- an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
- an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
- an ability to communicate effectively with a range of audiences*
- an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
- an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
- an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-6) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a,b	1.3d	2.1a,b	2.2a				
2		1.2b	1.3c	2.1a,b			2.1a	2.5a	
3	1.1b		1.3c					2.5b	2.6b
4	1.1c		1.3b						2.6a
5		1.2a	1.3d		2.2b		2.4b	2.5a	
6	1.1a,b,c		1.3c			2.3a	2.4c		

3. Planned learning activities and teaching methods

Week	Topic	CL O	Assessment s	Learning activities	Resources
1	Environmental Issues	1,6		Lecture, Discussion	[1] Chapter 1
2	Ecosystem	1	Quiz1	Lecture, Discussion, Quiz	[1] Chapter 3
3	Biodiversity and Evolution Biodiversity: Species Interaction and Population Control	1	Quiz2	Lecture, Discussion, Quiz	[1] Chapter 4,5
4	Human Population	2,5	IP1 Quiz3	Lecture, Presentation, Discussion, Quiz	[1] Chapter 6
5	Food, Soil, and Pest Management	3,5	IP2	Lecture, Presentation, Discussion	[1] Chapter 10
6	Water Resources and Water Pollution: Part 1 – Water Resources	3,5	IP3	Lecture, Presentation, Discussion	[1] Chapter 11
7	Water Resources and Water Pollution: Part 2 – Water Pollution	3	Quiz4	Lecture, Discussion, Quiz	[1] Chapter 11
8	Energy: Part 1 – Nonrenewable energies	3,5	IP4	Lecture, Presentation, Discussion	[1] Chapter 13
Midterm					
9	Energy: Part 2 – Renewable energies	3,5	IP5 Quiz5	Lecture, Presentation, Discussion, Quiz	[1] Chapter 13
10	Air Pollution, Climate Disruption, and Ozone Depletion – Part 1: Air Pollution	4,5	IP6	Lecture, Presentation, Discussion	[1] Chapter 15
11	Air Pollution, Climate Disruption, and Ozone Depletion – Part 2: Climate Disruption and Ozone Depletion	4	Quiz6	Lecture, Discussion, Quiz	[1] Chapter 15
12	Environmental Economics, Politics, and Worldviews	4,5	IP7	Lecture, Presentation, Discussion	[1] Chapter 17
13□1 5	Group presentation	5	IP8□10	Lecture, Presentation, Discussion	
Reserved week					
Final exam					

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
In-class presentation (IP) and Quiz (30%)	IP1,2 Quiz1,2 60%Pass	IP3□5 Quiz3 60%Pass	IP6□8 Quiz4,5 60%Pass	IP9,10 Quiz6 60%Pass	IP1□10 60%Pass	
Midterm exam (30%)	PartI: Q3□16 PartII: Q1□8	PartI: Q17□20 PartII: Q9,10				PartI: Q1□2

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
	PartIII: Q1 □ 8 60% Pass	PartIII: Q9,10 60% Pass				60% Pass
Final exam (40%)			PartI: Q1 □ 12 PartII: Q1 □ 6 PartIII: Q1 □ 6 60% Pass	PartI: Q13 □ 20 PartII: Q6 □ 10 PartIII: Q6 □ 10 60% Pass		

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Rubric for assessment questions in assignment/HW and exam.

Criteria	Level				
	Excellent	Good	Average	Weak	
	100	75	50	25	0
Writing part	Totally correct in method with the differences (if any) in results is within 5%	Calculations mainly correct with 1-2 mistakes and the results are not strongly affected (within 10%)	Direction is correct, calculations with 50% steps having mistakes and the results are strongly affected	Calculation is done but mainly wrong or less relevant	No calculation; calculation is not relevant
MCQs part	Answer is totally correct	Answer is correct at 75%	Answer is correct at 50%	Answer is not clear and less relevant	No answer; answer is not relevant

5.2. Rubric for evaluating presentation tasks


Oral communication value rubric:

	Capstone	Milestone		Benchmark
	76-100	51-75	26-50	0-25
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

	Capstone	Milestone		Benchmark
	76-100	51-75	26-50	0-25
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

6. Date revised: 11/3/2022

Ho Chi Minh City, 11/03/2022
**Dean of School of Industrial Engineering
and Management**
(Signature)



DR. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SPECIFICATION

COURSE SYLLABUS

SYLLABUS OF CORE KNOWLEDGE COURSES



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

**Course Name: INTRODUCTION TO INDUSTRIAL AND SYSTEMS
ENGINEERING**

Course Code: IS001IU

1. General information

<i>Course designation</i>	<i>This course will provide the students with an introduction to basic engineering concepts. Opportunities are provided to develop skills in oral and written communication, and department-specific material. Case studies are presented and analyzed. Students will work on interdisciplinary projects which corresponding to the building of physical models in the fields of Production, Transportation, Warehouse, and other industrial engineering related fields</i>
<i>Semester(s) in which the course is taught</i>	2
<i>Person responsible for the course</i>	Dr Ha Thi Xuan Chi
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Group project, discussion, and laboratory.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 50 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 12.5 Private study including examination preparation, specified in hours ²² : 37.5
<i>Credit points</i>	1 (1.8 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None

²² When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	Introduction to basic engineering concepts. Opportunities are provided to develop skills in oral and written communication, and department-specific material. CaseA studies are presented and analyzed. Students will work on interdisciplinary projects which corresponding to the building of physical models in the fields of Production, Transportation, Warehouse, and other industrial engineering related fields															
<i>Course learning outcomes</i>	<p>Upon the successful completion of this course students will be able to:</p> <table border="1"> <thead> <tr> <th>Competency level</th> <th>Course learning outcome (CLO)</th> </tr> </thead> <tbody> <tr> <td>Knowledge</td> <td>CLO1. Students have integrative knowledge of the basis and importance of Industrial Engineering and Management systems CLO2. Student have integrative knowledge, techniques and skills which enhance student's life-long learning ability.</td> </tr> <tr> <td>Skill</td> <td>CLO3. Students are able to cooperate with others, organize and implement industry-related projects effectively and get used to leadership.</td> </tr> <tr> <td>Attitude</td> <td>CLO4. Students develop life-long learning attitude implementing engineering blueprints in cooperation with engineers and non-engineers.</td> </tr> </tbody> </table>	Competency level	Course learning outcome (CLO)	Knowledge	CLO1. Students have integrative knowledge of the basis and importance of Industrial Engineering and Management systems CLO2. Student have integrative knowledge, techniques and skills which enhance student's life-long learning ability.	Skill	CLO3. Students are able to cooperate with others, organize and implement industry-related projects effectively and get used to leadership.	Attitude	CLO4. Students develop life-long learning attitude implementing engineering blueprints in cooperation with engineers and non-engineers.							
Competency level	Course learning outcome (CLO)															
Knowledge	CLO1. Students have integrative knowledge of the basis and importance of Industrial Engineering and Management systems CLO2. Student have integrative knowledge, techniques and skills which enhance student's life-long learning ability.															
Skill	CLO3. Students are able to cooperate with others, organize and implement industry-related projects effectively and get used to leadership.															
Attitude	CLO4. Students develop life-long learning attitude implementing engineering blueprints in cooperation with engineers and non-engineers.															
<i>Content</i>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture and practice session (3 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight (hour)</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Introduction to Industrial and Systems Engineering</td> <td>1</td> <td>I</td> </tr> <tr> <td>Introduction to Electrical and Automation Engineering</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Students do the project at Laboratory</td> <td>12</td> <td>U</td> </tr> <tr> <td>Group project presentation and demonstration</td> <td>1</td> <td>U</td> </tr> </tbody> </table>	Topic	Weight (hour)	Level	Introduction to Industrial and Systems Engineering	1	I	Introduction to Electrical and Automation Engineering	1	I, T	Students do the project at Laboratory	12	U	Group project presentation and demonstration	1	U
Topic	Weight (hour)	Level														
Introduction to Industrial and Systems Engineering	1	I														
Introduction to Electrical and Automation Engineering	1	I, T														
Students do the project at Laboratory	12	U														
Group project presentation and demonstration	1	U														
<i>Examination forms</i>	Project- based group presentation															
<i>Study and examination requirements</i>	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>															
<i>Reading list</i>																

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1					x		

2			x				
3					x		
4							x

Intended Learning Outcomes

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1c		1.3b						2.6a
2	1.1c		1.3a						2.6a
3	1.1c		1.3b						2.6a
4	1.1a 1.1b 1.1c		1.3c			2.3a	2.4c		

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Industrial and Systems Engineering	1, 2	Project	Lecture-advice, lab, team work, Q&A	
2	Introduction to Electrical and Automation Engineering	1, 2	Project	Lecture-advice, lab, team work, Q&A	
3-14	Students do the project at Laboratory	1,2,3, 4	Project	Lecture-advice, lab, team work, Q&A	
15	Group project presentation and demonstration	4	Project	Group presentation, Q&A	

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Group projects (100%)	Group project 80% Pass	Group project 80% Pass	Group project 80% Pass	Group project 80% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)			
	10		
TOTAL SCORE			
	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: April 15th, 2022

Ho Chi Minh City, 15/04/2022

**Dean of School of Industrial Engineering
and Management**

(Signature)

Dr. Nguyen Van Hop



**VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY**
School of Industrial Engineering and Management

COURSE SYLLABUS

**Course Name: INTRODUCTION TO COMPUTING –MATLAB
APPLICATION**

Course Code: IS086IU

1. General information

<i>Course designation</i>	<i>This course teaches computer programming using a programming system and language called MATLAB. It is an introductory programming course that uses MATLAB to illustrate general concepts in computer science and programming. Students who successfully complete this course will become familiar with general concepts in computer science, gain an understanding of the general concepts of programming, and obtain a solid foundation in the use of MATLAB.</i>
<i>Semester(s) in which the course is taught</i>	1
<i>Person responsible for the course</i>	<i>Dr. Dao Vu Truong Son</i>
<i>Language</i>	English
<i>Relation to curriculum</i>	<i>Compulsory</i>
<i>Teaching methods</i>	Lecture, lesson, project, seminar.
<i>Workload (incl. contact hours, self-study hours)</i>	<i>(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 Private study including examination preparation, specified in hours²³: 100</i>
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None
<i>Course objectives</i>	The objective of this course is to introduce students to the basics of Matlab programming as a tool for solving industrial engineering problems. The second part of the course concentrates on Matlab for writing programs with applications from industrial engineering

²³ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO 1. An ability to apply knowledge of mathematics, science and engineering
	Skill	CLO 2. An ability to design and conduct experiments, as well as to analyze and interpret data CLO 3. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
	Attitude	
<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>	
	Topic	
	Course	Overview, Orientation
	Introduction to Computers and Programming	
	Introduction to Matlab	
	Expressions and Interactivity	
	Making Decisions	
	Looping	
	Review for Midterm	
	Midterm	
	Introduction to Visual ProgramminG	
	Decision Making	
	Procedure	
	Elementary Data Structures	
Introduction to Object-Oriented Programming		
File Processing		
Review for final		
<i>Examination forms</i>	Multiple-choice questions, short-answer questions	
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.	
<i>Reading list</i>	Textbooks: [1] Stormy Attaway, MATLAB: A Practical Introduction to Programming and Problem Solving, 3rd edition, Elsevier, 2013. References: [1] Shawna Lockhart, Eric Tilleson, An Engineer's Introduction to Programming with MATLAB, SDC, 2018 Software: Matlab from Mathworks Inc.	

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

	ILO						
CLO	1	2	3	4	5	6	7

1	x						
2						x	
3		x					

ABET_Student Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

- 1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
- 2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
- 3. an ability to communicate effectively with a range of audiences*
- 4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
- 5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
- 6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
- 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
2		1.2a	1.3d				2.4b	2.5a	
3		1.2b	1.3c	2.1a 2.1b			2.4a	2.5a	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	
				Lecturer	Student
1	Course Overview, Orientation Introduction to Computers and Programming	CLO 1	Quiz	Lecture presentation	- Class discussion - Read book
2	Introduction to Matlab	CLO 1, 2,3	Quiz	Lecture presentation	- Class discussion - Read book
3	Expressions and Interactivity	CLO 1, 2	Quiz/HW	Lecture presentation	- Class discussion - Read book
4	Making Decisions	CLO 1, 2,3	Quiz/HW	Lecture presentation	- Class discussion - Read book
5	Looping	CLO 1, 2,3	Quiz/HW	Lecture presentation	- Class discussion - Read book
6	Review for Midterm	CLO 1, 2,3	Quiz/HW	Lecture presentation	- Class discussion - Read book

Midterm					
7	Introduction to Visual Programming	CLO 1, 2, 3	Quiz/HW	Lecture presentation	- Class discussion - Read book
8	Decision Making	CLO 1, 2, 3	Quiz/HW	Lecture presentation	- Class discussion - Read book
9	Procedure	CLO 1, 2, 3	Quiz/HW	Lecture presentation	- Class discussion - Read book
10	Elementary Data Structures	CLO 1, 2, 3	Quiz/HW	Lecture presentation	- Class discussion - Read book
11	Introduction to Object-Oriented Programming	CLO 1, 2, 3	Quiz/HW	Lecture presentation	- Class discussion - Read book
12	File Processing Review for final	CLO 1, 2, 3	Quiz/HW	Lecture presentation	- Class discussion - Read book
Final exam					

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
Quizzes and homework (15%)	60% Pass	60% Pass	60% Pass
Project (15%)	60% Pass	60% Pass	60% Pass
Midterm Exam (30%)	60% Pass	60% Pass	60% Pass
Final Exam (40%)	60% Pass	60% Pass	60% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:		HW/Assignment:	
Date:		Evaluator:	
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		

Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	monstrates complete understanding of the problem. All requirements of task are included in response
4	monstrates considerable understanding of the problem. All requirements of task are included.
3	monstrates partial understanding of the problem. Most requirements of task are included.
2	monstrates little understanding of the problem. Many requirements of task are missing.
1	monstrates no understanding of the problem.
0	response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.
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Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised:

Ho Chi Minh City, 2022

Dean of School of Industrial Engineering and Management

(Signature)

Dr. Nguyen Van Hop



COURSE SYLLABUS

Course Name: ENGINEERING PROBABILITY & STATISTICS

Course Code: IS004IU

1. General information

<i>Course designation</i>	<i>In this course, students typically learn the fundamental concepts of probability theory and statistical analysis and how they apply to engineering problems. The course focuses on developing students' understanding of probability models, statistical inference, data analysis, and the application of statistical techniques in engineering contexts.</i>
<i>Semester(s) in which the course is taught</i>	2
<i>Person responsible for the course</i>	Dr. Phan Nguyen Ky Phuc
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson, project
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload:170 Contact hours (please specify whether lecture, exercise, laboratory session, etc.):50 Private study including examination preparation, specified in hours ²⁴ : 120
<i>Credit points</i>	4 (6.2 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	
<i>Course objectives</i>	On completion of this course, the student will be able to develop probability problems in engineering, conditional probability, discrete and continuous distributions, sampling distribution, interval estimates, hypothesis testing, analysis of variance, regression models and non-parametric testing.

²⁴ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:																																			
	Competency level	Course learning outcome (CLO)																																		
	Knowledge	<p>CLO1. Students are able to master the basic knowledge of calculating histogram, percentile and basic statistics index</p> <p>CLO2. Students are able to master the basic knowledge of formulating the conditional probability, discrete, continuous random variable problem</p> <p>CLO3. Students are able to use different methods to solve engineering tasks such as setup the proper hypothesis testing, ANOVA, linear regression</p>																																		
Skill	CLO4. Students are able to apply their knowledge and develop practical skills for solving problems, conducting experiments and developing equipment and processes of engineering by using EXCEL software																																			
<i>Content</i>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (4 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Introduction to Probability and Statistics</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Random variables & Condition Probability</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Discrete Random Variables</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Continuous Random Variables</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Sampling and Central Limit Theorems</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>One Population Hypothesis Testing</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Two Population Hypothesis Testing</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>ANOVA</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Linear Regression</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Excel Tool</td> <td>1</td> <td>U</td> </tr> </tbody> </table>			Topic	Weight	Level	Introduction to Probability and Statistics	1	I, T	Random variables & Condition Probability	2	I, T	Discrete Random Variables	2	I, T	Continuous Random Variables	2	I, T	Sampling and Central Limit Theorems	1	I, T	One Population Hypothesis Testing	2	I, T	Two Population Hypothesis Testing	2	I, T	ANOVA	1	I, T	Linear Regression	1	I, T	Excel Tool	1	U
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<i>Study and examination requirements</i>	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>																																			
<i>Reading list</i>	<p>Textbooks:</p> <p>[1] Introduction to Probability and Statistics for Engineers and Scientists 4th ed. Sheldon M. Ross, Academic Press</p> <p>References:</p> <p>1. A first course of Probability, 4th ed, Sheldon M. Ross, Prentice Hall</p>																																			

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1 -7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	X						
2	X						
3						X	
4						X	

Intended Learning Outcomes

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
2		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
3		1.2a	1.3d		2.2b		2.4b	2.5a	
4		1.2a	1.3d		2.2b		2.4b	2.5a	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Probability and Statistics	1		Lecture	
2 & 3	Random variables & Condition Probability	1	HW1	Lecture Think pair-share HW	
4&5	Discrete Random Variables	2	Quiz1	Lecture Quiz	
6&7	Continuous Random Variables	2	HW2	Lecture HW	

8	Sampling and Central Limit Theorems	2	HW3	Lecture HW	
9	Midterm				
10	One Population Hypothesis Testing	3		Lab	
11 & 12	Two Population Hypothesis Testing	3	Quiz2	Lecture Quiz	
13 & 14	ANOVA	3		Lecture HW	
15	Linear Regression	3	HW4	Lecture HW Group Project	
16	Excel Tool	4	Quiz3	Lecture Quiz	
17	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class exercises/quizzes (10%)	Qz1 60% Pass		Qz3 60% Pass% Pass
Howework exercises (20%)	HW1 50% Pass	HW2 50% Pass	HW3 50% Pass	HW4 50% Pass
Midterm (30%)		60% Pass		
Final (40%)			60% Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Part 1..... (....%)			
Criterion 1:			
Criterion 2:			
Criterion 3:			
Criterion ...:			
Part 2..... (....%)			
Criterion 1 ...:			
Criterion ...:			
Part 3..... (....%)			
Criterion 1...:			
Criterion ...:			
Part (....%)			
TOTAL SCORE		100	

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.
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Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is not appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

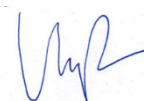
Source: Association of American Colleges and Universities

6. Date revised:

Ho Chi Minh City, 2022

Dean of School of Industrial Engineering and Management

(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: ENGINEERING ECONOMY

Course Code: **IS020IU**

1. General information

<i>Course designation</i>	<i>This subject will provide the student with a comprehensive view of economic decisions involving engineering alternatives; annual cost, present & future worth, rate of return, and benefit-to-cost; before and after-tax replacement economy; organizational financing; break-even charts; unit and minimum-cost public sector studies.</i>
<i>Semester(s) in which the course is taught</i>	4
<i>Person responsible for the course</i>	MSc. Nguyen Hoang Huy
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, homework.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, etc.): 37.5 Private study including examination preparation, specified in hours ²⁵ : 100
<i>Credit points</i>	03 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None

²⁵ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	Students will be provided with skills of using data from a variety of sources, be introduced to basic principles of economic analysis for decision making among alternative courses of action in engineering; understand knowledge of probabilistic risks, depreciation, tax and benefit-cost ratios in analyzing engineering applications. Besides that, students can apply cash flow diagrams into economy analysis and alternative analysis techniques for engineering applications; apply techniques and methods of sensitivity analysis for engineering problems to compare and make decisions between alternatives.																											
<i>Course learning outcomes</i>	<p>Upon the successful completion of this course students will be able to:</p> <table border="1"> <thead> <tr> <th>Competency level</th> <th>Course learning outcome (CLO)</th> </tr> </thead> <tbody> <tr> <td>Knowledge</td> <td> CLO1. Understand major principles of economic analysis for decision making among alternative courses of action in engineering as breakeven, costs, cash flow. CLO2. Understand knowledge of probabilistic risks, depreciation, tax and benefit-cost ratios in analyzing engineering applications. </td> </tr> <tr> <td>Skill</td> <td>CLO3. Apply cash flow diagram into economy analysis and sensitivity analysis for engineering problems to compare and make decisions among alternatives.</td> </tr> <tr> <td>Attitude</td> <td>CLO4. Reasons around ethical and privacy issues in this course conduct and apply ethical practices.</td> </tr> </tbody> </table>	Competency level	Course learning outcome (CLO)	Knowledge	CLO1. Understand major principles of economic analysis for decision making among alternative courses of action in engineering as breakeven, costs, cash flow. CLO2. Understand knowledge of probabilistic risks, depreciation, tax and benefit-cost ratios in analyzing engineering applications.	Skill	CLO3. Apply cash flow diagram into economy analysis and sensitivity analysis for engineering problems to compare and make decisions among alternatives.	Attitude	CLO4. Reasons around ethical and privacy issues in this course conduct and apply ethical practices.																			
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<i>Study and examination requirements</i>	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>																											

<i>Reading list</i>	[1] W.G. Sullivan, E.M. Wicks, C.P. Koelling (2012), Engineering Economy, 15th edition, Prentice Hall. [2] Blank, L., & Tarquin, A. (2012). Engineering Economy 7th edition. [3] Eschenbach, T. G. (2003). Engineering economy. New York: Oxford University Press.
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2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1		x					
2		x					
3						x	
4				x			

Intended Learning Outcomes (ILO)

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2b	1.3c	2.1a, 2.1b			2.4a	2.5a	
2		1.2b	1.3c	2.1a, 2.1b			2.4a	2.5a	
3	1.2a		1.3d		2.2b		2.4b	2.5a	
4	1.1b		1.3c					2.5b	2.6b

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Lecture 1: Introduction to EE	1		Lecture, Group work	[1]. 1

2	Lecture 2: Cost concepts and Design Economics	1		Lecture, Group work	[1].2
3 & 4	Lecture 3: The time value of money	1,3,4	HW 1	Lecture, Group work	[1].4
5	Lecture 4: The time value of money (con't)	1,3,4	HW 2	Lecture, Group work	[1]. 4
6 & 7	Lecture 5: Evaluating a single project.	3	HW 3	Lecture, Group work	[1]. 5
8	Review for Midterm				
	Midterm				
9 & 10	Lecture 6: Comparison and Selection among alternatives	2, 3, 4	HW 4	Lecture, Group work	[1]. 6
11&12	Lecture 7: Depreciation and Income taxes	2, 3, 4	HW 5	Lecture, Group work	[1]. 7
13	Lecture 8: Evaluating projects with the benefit-cost ratio method	2, 3, 4	HW 6	Lecture, Group work	[1]. 10
14	Lecture 9: Replacement analysis	2, 3, 4	HW 6	Lecture, Group work	[1]. 9
15	Review for Final Exam				
	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Homework exercises (30%)	HW1-2 50% Pass	HW4, HW5, HW6 50% Pass	HW1-6 50% Pass	HW1-6 50% Pass
Midterm exam (30%)	Q1 50% Pass	Q2 50% Pass	Q3, Q4 50% Pass	
Final exam (40%)	Q1 50% Pass	Q2 50% Pass	Q3, Q4 50% Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		

Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.

Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: March 23, 2022

Ho Chi Minh City, 23/03/2022

**Dean of School of Industrial
Engineering and Management**

(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SPECIFICATION

COURSE SYLLABUS

**SYLLABUS OF SPECIALIZED KNOWLEDGE (COMPUSORY)
COURSES**



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: PRODUCTION MANAGEMENT

Course Code: IS019IU

1. General information

<i>Course designation</i>	Introduction to production systems. Production planning and control in decision making. Forecasting. Aggregate production planning. Capacity planning. Materials requirement planning. Advanced techniques and approaches in modern production planning and control for designing production systems.
<i>Semester(s) in which the course is taught</i>	4
<i>Person responsible for the course</i>	Tran Van Ly
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, homework.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, etc.): 37.5 Private study including examination preparation, specified in hours ²⁶ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None
<i>Course objectives</i>	Students will be provided with knowledge and skills of forecasting, inventory, aggregate planning, MPS/MRP, facility layout and location, and production scheduling & sequencing.

²⁶ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:																													
	Competency level	Course learning outcome (CLO)																												
	Knowledge	<p>CLO1. Able to align the project to the organization's strategic plans and business justification throughout its lifecycle; to identify project goals, constraints, deliverables, performance criteria, control needs, and resource requirements in consultation with stakeholders.</p> <p>CLO2. Able to manage the scope, cost, timing, and quality of the project, at all times focused on project success as defined by project stakeholders Able to implement general business concepts, practices, and tools to facilitate project success.</p>																												
	Skill	CLO3. Work effectively in group project in a specific context; combining the techniques to conduct practical cases. Respond to the needs of community and industrial sectors																												
Attitude	CLO4. Able to apply appropriate legal and ethical standards. Adapt project management practices to meet the needs of stakeholders from multiple sectors of the economy (i.e. consulting, government, arts, media, and charity organizations); Identify and follow strictly ethical disciplines in project management																													
<i>Content</i>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (3 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Lecture 1: Introduction to Production Management</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Lecture 2: Forecasting</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Lecture 3: Inventory Management</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Lecture 4: Aggregate Planning</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Lecture 5: Modern Production System</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Lecture 6: Material Requirement Planning (MRP)</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Lecture 7: Facility layout and Location</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Lecture 8: Scheduling & Sequencing</td> <td>1</td> <td>I, T</td> </tr> </tbody> </table>			Topic	Weight	Level	Lecture 1: Introduction to Production Management	1	I, T	Lecture 2: Forecasting	1	I, T	Lecture 3: Inventory Management	2	I, T	Lecture 4: Aggregate Planning	1	I, T	Lecture 5: Modern Production System	2	I, T	Lecture 6: Material Requirement Planning (MRP)	2	I, T	Lecture 7: Facility layout and Location	2	I, T	Lecture 8: Scheduling & Sequencing	1	I, T
Topic	Weight	Level																												
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Lecture 4: Aggregate Planning	1	I, T																												
Lecture 5: Modern Production System	2	I, T																												
Lecture 6: Material Requirement Planning (MRP)	2	I, T																												
Lecture 7: Facility layout and Location	2	I, T																												
Lecture 8: Scheduling & Sequencing	1	I, T																												
<i>Examination forms</i>	Short-answer questions, exercises																													

<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
<i>Reading list</i>	[1] Russell & Taylor, Operations Management, Along the Supply Chain. 7th ed., John Wiley & Son, Inc. [2] W. J. Hopp and M. L. Spearman (2008), Factory Physics: The Foundations of Manufacturing Management, 3rd ed., Irwin/McGraw-Hill. [3] D. Sipper and R. L. Bulfin, (1997), Production: Planning, Control, and Integration, McGraw Hill. [4] Edward A. Silver, David F. Pyke and Rein Peterson, Inventory Management and Production Planning and Scheduling, 3rd ed., John Wiley & Sons.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1		x					
2		x					
3						x	
4				x			

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

- an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
- an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
- an ability to communicate effectively with a range of audiences*
- an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
- an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
- an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2b	1.3c	2.1a 2.1b			2.4a	2.5a	
2		1.2b	1.3c	2.1a 2.1b			2.4a	2.5a	
3		1.2a	1.3d		2.2b		2.4b	2.5a	
4	1.1b		1.3c					2.5b	2.6b

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
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1	Lecture 1: Introduction to Production Management	1		Lecture, Group work	[1]. 1
2	Lecture 2: Forecasting	1	HW 1	Lecture, Group work	[1].12
3 & 4	Lecture 3: Inventory Management	1,3,4	HW 2	Lecture, Group work	[1].13
5&6	Lecture 4: Aggregate Planning	1,3,4	HW 3	Lecture, Group work	[1]. 14
7	Lecture 5: Modern Production System	3		Lecture, Group work	[1]. 16
8	Review for Midterm				
	Midterm				
9 & 10	Lecture 6: Material Requirement Planning (MRP)	2, 3, 4	HW 4	Lecture, Group work	[1]. 15
11&12	Lecture 7: Facility layout and Location	2, 3, 4	HW5	Lecture, Group work	[1]. 7
13	Lecture 8: Scheduling & Sequencing	2, 3, 4	HW 6	Lecture, Group work	[1]. 17
14	Project Presentation	2, 3, 4		Problems solving Group work	[1].
15	Review for Final Exam				
	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Homework exercises (30%)	HW1-2 50%Pass	HW4, HW5, HW6 50%Pass	HW1-6 50%Pass	HW1-6 50%Pass
Midterm exam (30%)	Q1 50%Pass	Q2 50%Pass	Q3, Q4 50%Pass	
Final exam (40%)	Q1 50%Pass	Q2 50%Pass	Q3, Q4 50%Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports	
Student:	HW/Assignment:
Date:	Evaluator:

	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)			
TOTAL SCORE			
	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.

Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: August 23, 2022

Ho Chi Minh City, 23/08/2022
Dean of School of Industrial Engineering and
Management
(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

**Course Name: DETERMINISTIC MODELS IN OPERATIONS
RESEARCH**

Course Code: **IS081IU**

1. General information

<i>Course designation</i>	This course provides knowledge to develop linear programming and integer programming formulations for engineering and economic systems, determine optimal solutions to a variety of mathematical programming problems, and present managerial recommendations based on optimal solutions and sensitivity analysis.
<i>Semester(s) in which the course is taught</i>	2
<i>Person responsible for the course</i>	<i>Dr. Ha Thi Xuan Chi</i>
<i>Language</i>	English
<i>Relation to curriculum</i>	<i>Compulsory</i>
<i>Teaching methods</i>	<i>Lecture, lesson, project</i>
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 170 Contact hours (lecture): 50 Private study including examination preparation, specified in hours ²⁷ : 120
<i>Credit points</i>	4 (6 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	
<i>Course objectives</i>	On completion of this course, the student will be able to develop linear programming and integer programming formulations for engineering and economic systems, determine optimal solutions to a variety of mathematical programming problems, and present managerial recommendations based on optimal solutions and sensitivity analysis.

²⁷ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	<p>CLO1. Able to define a mathematical model, formulate a mathematical model with 2 variables, Able to solve a mathematical model with 2 variables by graphical method</p> <p>CLO2. Able to formulate a mathematical model with more than 2 variables, solve a mathematical model with more than 2 variables by simplex method, big M technique, two phase and revised method.</p> <p>CLO3. Able to formulate Integer programming, Dynamic Programming, transportation, assignment, shortest paths problems, maximum flow, minimize costs models, solve by using techniques: Branch and Bound, Min-Cut Theory, Dijkstra Algorithm</p>
Skill	<p>CLO4. Able to use CPLEX/LINGO software to solve complex problems.</p> <p>CLO5. Able to analyses output from the linear programming model by using sensitivity analysis and using duality theory to interpret economic meaning</p> <p>CLO6. Solve NLPs with one variable and several variables</p>	

<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (3 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Introduction to Operations Research	1	I, T
	Formulating linear programming problems.	2	I, T
	Solution of an LP: Graphical Solution.	1	I, T
	Solution of an LP: Simplex Method, Standard Form, Degeneracy, Alternate Solutions, Unbounded LP, Infeasible LP.	2	I, T
	Solution of an LP: Finding an initial feasible solution, Big-M Method, Two-Phase Method, Solution of an LP using a software package - LINDO.	2	I, T
	Revised Simplex Method, Simplex Formulas, Shadow Price, Reduce Cost.	2	I, T
	Sensitivity Analysis: Changing the objective function coefficient of a basic variable, changing the objective function coefficient of a nonbasic variable, changing the constraint coefficient of a nonbasic variable, changing the RHS values of constraints, adding a new variable.	1	T, U
	LINGO/CPLEX: Introduction Solving Linear Programming Problem	0.5	T, U
	Duality Theorem, Finding the dual of an LP, Economic Interpretation of the Dual Problem and Dual Variables, Dual Simplex Method, How to	0.5	I, T
	Network optimization: Shortest Path Problems: Formulating Equipment replacement problem as Shortest Path Problems, Solving shortest path problems using Dijkstra's Algorithm		T
	Integer Programming Problems. Either/or Constraints, If then Constraints, Fixed Charge Problems, Solving Integer Programs using Branch and Bound Method.		T
Dynamic programming Problems		T	
LINGO/CPLEX Solving Network Optimization, IP problems, DP problems		T	
Nonlinear programming: Solving with one variable and several variables Karush-Kuhn-Tucker		T	

<i>Examination forms</i>	Written Exam
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
<i>Reading list</i>	<p>Textbooks: [1] Introduction to Operation Research 9th ed. Hillier,Lieberman, McGrawHill [2] Introduction to Mathematical Programming fourth edition, Wayne L. Winston, Munirpallam Venkataramanan.</p> <p>References: 1. Bodhibrata Nag, <i>Business Applications of Operations Research</i>, Business Expert Press, 2014. ISBN-13: 978-1-60649-526-1. 2. R.K. Ahuja, T.L.,Magnanti, J.B. Orlin, <i>Network Flows: Theory, Algorithms, and Applications</i>, Prentice Hall, 1993. ISBN 0 -13-617549-X. 3.. M.S. Bazaraa, H.d. Sherali, C.M. Shetty, <i>Nonlinear Programming: Theory and Algorithms</i>, John Wiley & Sons, 1993, 2nd edition. ISBN 0-471-55793-5. 4. G.C. Onwubolu, and B.V.Babu (edited), <i>New Optimization Techniques in Engineering – Nguyen Van Hop, and M.T. Tabucanon, Chapter 14: Improvement of Search Genetic Algorithms: An Application of PCB Assembly Sequencing Problem</i>, Springer-Verlag, Heitzberg, Germany, 2003. ISBN 1434 – 9922. 5. Hamdy A. Taha, <i>Operation Research: An Introduction</i>, Prentice Hall, 2017, 10th Edition. ISBN-13: 978-1-292-16554-7</p>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1 -7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	X	X					
2	X	X					
3	X	X					
4						X	
5						X	
6	X	X					

Intended Learning Outcomes

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a,b	1.3c,d	2.1a,b	2.2a		2.4a	2.5a	
2		1.2a,b	1.3c,d	2.1a,b	2.2a		2.4a	2.5a	
3		1.2a,b	1.3c,d	2.1a,b	2.2a		2.4a	2.5a	
4		1.2a	1.3d		2.2b		2.4b	2.5a	
5		1.2a	1.3d		2.2b		2.4b	2.5a	
6		1.2a,b	1.3c,d	2.1a,b	2.2a		2.4a	2.5a	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Operations Research	1		Lecture	
2	Formulating linear programming problems.	1	HW1	Lecture Think pair-share HW	
3	Solution of an LP: Graphical Solution.	1	Quiz1	Lecture Quiz	
4&5	Solution of an LP: Simplex Method, Standard Form, Degeneracy, Alternate Solutions, Unbounded LP, Infeasible LP.	2	HW2	Lecture HW	
6	Solution of an LP: Finding an initial feasible solution, Big-M Method, Two-Phase Method, Solution of an LP using a software package - LINDO.	2, 4	HW3	Lecture HW	
7	Revised Simplex Method, Simplex Formulas, Shadow Price, Reduce Cost.	2	HW4	Lecture HW	
8	Sensitivity Analysis: Changing the objective function coefficient of a basic variable, changing the objective function coefficient of a nonbasic variable, changing the constraint coefficient of a nonbasic variable, changing the RHS values of constraints, adding a new variable.	5	HW5	Lecture Class discussion HW	
9	Midterm				
10	LINGO/CPLEX: Introduction	4		Lab	

	Solving Linear Programming Problem				
11	Duality Theorem, Finding the dual of an LP, Economic Interpretation of the Dual Problem and Dual Variables, Dual Simplex Method, How to	5	Quiz2	Lecture Quiz	
12	Network optimization: Shortest Path Problems: Formulating Equipment replacement problem as Shortest Path Problems, Solving shortest path problems using Dijkstra's Algorithm	3	HW6	Lecture HW	
13	Integer Programming Problems. Either/or Constraints, If then Constraints, Fixed Charge Problems, Solving Integer Programs using Branch and Bound Method.	3	HW5 Project	Lecture HW Group Project	
14	Dynamic programming Problems	3	Quiz3	- Lecture Quiz	
15	LINGO/CPLEX Solving Network Optimization, IP problems, DP problems	5			
16	Nonlinear programming: Solving with one variable and several variables Karush–Kuhn–Tucker	6			
17	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
In-class exercises/quizzes (10%)	Qz1 60% Pass		Qz3 60% Pass% Pass	Qz2 60% Pass	
Howework exercises (20%)	HW1 50% Pass	HW2 50% Pass HW3 50% Pass	HW3 50% Pass HW6 50% Pass	HW3 50% Pass	HW5 50% Pass	
Midterm (30%)		60% Pass			60% Pass	
Final (40%)			60% Pass			60% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (80%)			
Problem Identification: Be able to identify different logistics and supply chain problems	20		

Data collection and software usage: Know how to transform the data into the proper form and solve the models using computer-based software such as CPLEX, LINGO, PyCharm, MATLAB, etc.	20		
Methodology: Know how to formulate and solve different logistics and supply chain problems by using the mathematical techniques	20		
Solution and Implementations: Be able to solve practical problems and do the output analysis.	20		
Report writing and Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: This rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.

Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised:

Ho Chi Minh City, 2022
Dean of School of Industrial Engineering and
Management

(Signature)



Dr. Nguyen Van Hop



**VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY**
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: Engineering Mechanics - Dynamics

Course Code: **IS090IU**

1. General information

<i>Course designation</i>	Students learn about kinematics of particles to rigid bodies, rotation of a rigid body, plane motion of a rigid body, relative motion, the principles of work and energy, impulse and momentum, impact.
<i>Semester(s) in which the course is taught</i>	5
<i>Person responsible for the course</i>	Dr. Dao Vu Truong Son
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, Exercises, Assignment.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 85 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 25 Private study including examination preparation, specified in hours ²⁸ : 60
<i>Credit points</i>	2 (3.1 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Nil
<i>Course objectives</i>	Understand the kinematics of particles to rigid bodies, rotation of a rigid body, plane motion of a rigid body, relative motion, the principles of work and energy, impulse and momentum, impact.

²⁸ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:		
	Competency level	Course learning outcome (CLO)	
	Knowledge	CLO1. Understand the fundamental and advanced concepts in kinematics. CLO2. Understand the fundamental and advanced concepts in kinetics.	
	Skill	CLO3. Use engineering methodology to solve engineering mechanics problems	
Attitude	CLO4. Students will have positive attitude in both self-learning and group discussion with other disciplines related to engineering mechanic related problems.		
<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (3 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Kinematics of a particle;	6	I, T
	Kinetics of a particle;	6	I, T
	Dynamics of particle systems; center of mass, equations of motion, work and energy, impulse and momentum.	9	I, T
	Kinematics of rigid bodies; plane motion, relative velocity, instantaneous center, relative acceleration.	9	I, T
Kinetics of rigid bodies; angular momentum, equations of motion, work and energy, impulse and momentum	9	I, T	
Introduction to elementary vibrations; free vibrations of single d.o.f. systems.	3	T, U	
<i>Examination forms</i>	Practice, Writing questions		
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
<i>Reading list</i>	J.L. Meriam and L.G. Kraige, Engineering Mechanics Vol.2-Dynamics, 3rd ed., Wiley, 1992		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2		x					
3			x	x			
4					x	x	

Intended Learning Outcomes (ILO)

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
2		1.2b	1.3c	2.1a 2.1b			2.4a	2.5a	
3	1.1b 1.1c		1.3a 1.3c					2.5b	2.6a 2.6b

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1,2	Kinematics of a particle;	1	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].1
3,4	Kinetics of a particle;	1, 2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].2
5,6,7	Dynamics of particle systems; center of mass, equations of motion, work and energy, impulse and momentum.	2,3	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1] 3
8	Review		Exercises		
9	Midterm				
10,11,12	Kinematics of rigid bodies; plane motion, relative velocity, instantaneous center, relative acceleration.	4	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].4
13,14,15	Kinetics of rigid bodies; angular momentum, equations of motion, work and energy, impulse and	3, 4	Exercises, HW, Quiz	Lecture, Discussion, Inclass-Quiz	[1].5

	momentum				
16	Introduction to elementary vibrations;	3, 4	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].6
17	Review				
18	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class assignment (30%)	HW 1 60% Pass	HW2 60% Pass	HW3-HW4 60% Pass	
Midterm exam (30%)	60% Pass	60% Pass		
Final exam (40%)		60% Pass	60% Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (65%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	35		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (5%)	05		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW
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Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1

Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: April 15, 2022

Ho Chi Minh City, 15/04/2022

**Dean of School of Industrial Engineering
and Management**

(Signature)

Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: WORK DESIGN & ERGONOMICS

Course Code: **IS017IU**

1. General information

<i>Course designation</i>	<i>This subject will provide Problem solving tools (recording and analysis tools, activity charts). Operation analysis, manual work design (principles of motion economy, motion study). Time study (performance rating and allowances), predetermined time systems. Work environment design.</i>
<i>Semester(s) in which the course is taught</i>	4
<i>Person responsible for the course</i>	Nguyen Van Chung
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson, project, Laboratory
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 190 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 50 Private study including examination preparation, specified in hours ²⁹ : 140
<i>Credit points</i>	4 (3 lecture + 1 laboratory) (6.9 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None
<i>Course objectives</i>	Students will be provided the basic concepts of work design and ergonomics. Understand different methods of engineering and operations analysis, motion study, work design. Alternative solution methodologies available in time study, ergonomics and human factors. To increase productivity, machine/ equipment utilization, and to reduce human efforts, and to motivate and product employees' health.

²⁹ When calculating contact time, each contact hour is counted as a full hour because the organization of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO1. Students will be able to Recognize and understand basic concepts of work design and ergonomics. and solve complex tasks and problems across several disciplines from global, economic, environmental, and societal aspects.
	Skill	CLO2. Students will be able to identify different methods of engineering and operations analysis, and solve the motions, the postures, work design, and time problems by applying principles of basic motion elements and Ergonomics, to evaluate and choose alternative solution methodologies.
Attitude	CLO3. Students will Apply knowledge in work design and ergonomics to increase productivity, machine/ equipment utilization, and to reduce human efforts, and to motivate and product employees' health.	

<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture and practice session		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Content	Weight (hour)
	Introduction to Work design and Ergonomics	Introduction to the work, work element, basic motion element, Work system. Chapter 1 (Mikell P. Groover)	1
	Methods Engineering and Graphical tools for Operations Analysis	Introduction to the method engineering, Operation analysis. And analysis tools. Chapter 8 (Mikell P. Groover)	1
	Motion/Methods Study and Work Design	Basic motion elements and work analysis. Principles of motion economy and work design. Chapter 2, 10 (Mikell P. Groover)	2
	NIOSH Lifting Equation	NIOSH Lifting equation, Recommended weight limit. T. R. Water, V. P. Anderson, A. Garg	2
	Midterm Exam		
	Introduction to Time Study	Determine time standard, Allowances. Chapter 12 (Mikell P. Groover)	1
	Direct Time Study	Direct time study procedure, Performance rating, time study equipment. Chapter 13 (Mikell P. Groover)	2
	Predetermined Motion Time Systems	Methods – time measurement. Chapter 14 (Mikell P. Groover)	2
	Ergonomics and Human Factors	Introduction to ergonomics and human factors, anthropometry, design guidelines for cognitive work. Chapter 22, 23, 24 (Mikell P. Groover)	2
Learning Curves	Learning curve theory, determining and application of learning curve. Chapter 19 (Mikell P. Groover)	0.5	
<i>Laboratory 1</i> Measurement of Grip strength	To measure and compare grip strength of right and left hands. Compare with Grip strength test norms	1	
<i>Laboratory 2</i> Measurement of working environment factors	To measure the intensity of illumination, sound level, distance, temperature and practice on measuring instruments	1	
<i>Laboratory 3</i> Introducing the Ergonomics software	Introduction to TK Motion Manager Software by NexGen Ergonomics	1	
		Level	
		I, T	
		I, T	
		T, U	
		T, U	
		T	
		T, U	
		T, U	
		T, U	
		I, T	
		U	
		U	
		U	

	<i>Laboratory 4 Work Design</i>	To design the job, analyze the basic motion elements	2	U
	<i>Laboratory 5 Motion study and Time study</i>	Design the motions for assembly the product. Improve the motions and posture	2	U
	<i>Laboratory 6 Design Layout</i>	Design the room (office) based on ergonomics and condition environment.	1	U
Final Exam				
<i>Examination forms</i>	Writing questions			
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.			
<i>Reading list</i>	[1] Mikell P. Groover, <i>Work Systems and the Methods, Measurement, and Management of Work</i> , Prentice-Hall, 2007. [2] A. Freivalds and B. Niebel, <i>Niebel's Methods, Standards, and Work Design</i> , McGraw-Hill, 2009. [3] T. R. Water, V. P. Anderson, A. Garg, <i>Applications Manual for the Revised NIOSH Lifting Equation</i> , Cincinnati, Ohio 45226, 1994.			

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

	ILO						
CLO	1	2	3	4	5	6	7
1		x					
2	x						
3						x	

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*

2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2b	1.3c	2.1a 2.1b			2.4a	2.5a	
2		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
3		1.2a	1.3d		2.2b		2.4b	2.5 a	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Work design and Ergonomics	CLO 1		Lecture presentation, in-class discussion	Reading [1] , [2]
2	Methods Engineering and Graphical tools for Operations Analysis	CLO 1,2	Quiz, Exercises	Lecture presentation, in-class discussion	Reading [1] , [2]
3-4-5	Motion/Methods Study and Work Design	CLO 2, 3	Exercises, Assignment	Lecture presentation, in-class discussion	Reading [1] , [2]
6-7	NIOSH Lifting Equation	CLO 2, 3	Quiz, Exercises	Lecture presentation, in-class discussion	Reading [3]
8-9	Midterm				
10	Introduction to Time Study	CLO 1		Lecture presentation, in-class discussion	Reading [1]
11-12	Direct Time Study	CLO 2, 3	Quiz, Exercises	Lecture presentation, in-class discussion	Reading [1] , [2]
13-14	Predetermined Motion Time Systems	CLO 2, 3	Exercises, Assignment	Lecture presentation, in-class discussion	Reading [1] , [2]
15-16	Ergonomics and Human Factors	CLO 1, 2, 3	Exercises	Lecture presentation, in-class discussion	Reading [1] , [2]

17	Learning Curves	CLO 1		Lecture presentation, in-class discussion	Reading [1]
8 weeks	Laboratory 1 (1 week) Measurement of Grip strength Laboratory 2 (1 week) Measurement of working environment factors Laboratory 3 (1 week) Introducing the Ergonomics software Laboratory 4 (2 week) Work Design Laboratory 5 (2 week) Motion study and Time study Laboratory 6 (1 week) Design Layout	CLO 3	Practices		
18	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
In-class assignment (10%)	Quiz 60% Pass	Group Assignment 60% Pass	
Group Lab (20%)			Group Lab 80% Pass
Midterm exam (30%)	60% Pass	60% Pass	
Final exam (40%)		60% Pass	60% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Clearly identify the problems and the purpose	10		
Introduction demonstrates thorough knowledge of relevant background	10		
Analysis and discussion demonstrate good subject mastery	35		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		

Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)		10	
TOTAL SCORE		100	

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.
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Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is not appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: August 22th, 2022

Ho Chi Minh City, 22/08/2022

Dean of School of Industrial Engineering and Management

(Signature)

Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: CAD/CAM/CNC

Course Code: **IS085IU**

1. General information

<i>Course designation</i>	<i>This subject will provide design parts or mechanical products by CAD/CAM software. The students are studied geometric transformations, geometric modeling, mathematical representations of curves, Wire frame modeling, surface and solid modeling. Numerical control systems and machine tools. Manual part programming, computerized part programming, CAD/CAM/CNC systems integration.</i>
<i>Semester(s) in which the course is taught</i>	5
<i>Person responsible for the course</i>	Nguyen Van Chung
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, Exercises, Assignment, Lab.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 Private study including examination preparation, specified in hours ³⁰ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Engineering Drawing

³⁰ When calculating contact time, each contact hour is counted as a full hour because the organization of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	Understand the fundamental and advanced concepts in computer graphics and computer-aided-design. Know the functions of a geometric solid modeler and modeling an object. Use commercial CAD/CAM software for engineering design. Understand CAD/CAM/CNC can be used in the different stages of design and manufacture of a product	
<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO1. Students will be able to understand the fundamental and advanced concepts in computer graphics, computer-aided-design and computer – aided Manufacturing.
	Skill	CLO2. Use commercial CAD/CAM software for engineering design and manufacturing.
Attitude	CLO3. Understand CAD/CAM/CNC can be used in the different stages of design and manufacture of a product on CNC machines.	

<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>			
	Weight: lecture and practice session			
	Teaching levels: I (Introduce); T (Teach); U (Utilize)			
	Topic	Content	Weight (hour)	Level
	Introduction to CAD/CAM/CNC	Introduction to CAD/CAM, CNC. Need for CAD/CAM. Hardware, software. Application. Chapter 1 (Ibrahim Zeid)	1	I, T
	Geometric Transformations and Modeling	Types of geometric models. Coordinate systems. Chapter 2 (Ibrahim Zeid) Chapter 6 (P.Radhakrishman, et al)	2	I, T
	Mathematical representations of Curves, surfaces, Solids	Curves, surfaces, solids Representation. Bezier, B-Spline curves and solids. Chapter 6, 7, 9 (Ibrahim Zeid)	3	T, U
	CAD/CAM Data Exchange	Types of Interfaces, Various standard interfaces, IGES (Initial Graphics Exchange Specification)	1	T, U
	Midterm Exam			
	Numerical Control Systems	Fundamentals of NC Technology. CNC, the components of CNC. Application Chapter 7, 23 (Mikell P. Groover)	2	T, U
	CNC Machines	Types of CNC machines. Application of CNC machines. Chapter 12 (P.Radhakrishman, et al)	2	T, U
	NC programming	Types of part programming. Fundamental elements for developing manual part programming. Programming for milling and turning. Chapter 23 (Mikell P. Groover)	3	T, U
	Computer-Aided Process Planning	Introduction and activities of CAPP. CAPP approaches and systems. Information required for CAPP Chapter 9 (P.Radhakrishman, et al) Chapter 24 (Mikell P. Groover)	1	T, U
	CAD/CAM/CNC Lab	Lab 1. Initiating the Graphics Package. Lab 2. Drawing of Primitives. Lab 3. Modifying Geometry. Lab 4. Toolpath Creation Lab 5. Generation of NC program Lab 6. Link and run-on CNC machine	3	T, U
Final Exam				

<i>Examination forms</i>	Practice, Writing questions
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
<i>Reading list</i>	[1] Ibrahim Zeid, "CAD/CAM Theory and Practice", 2nd ed., Mc Graw Hill, 2009. [2] P.Radhakrishnan, S. Subramanyan, V. Raju, <i>CAD/CAM/CIM</i> , New Age International Limited, Publishers, 2008. [3] Mikell P. Groover, Automation, Production Systems, and Computer-Integrated Manufacturing, 3rd edition, Prentice Hall, 2007. [4] SOFTWARE: Mastercam/Solid work/Pro-E

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2				x			
3						x	

Intended Learning Outcomes (ILO)

Criteria for Accrediting Engineering Programs, 2020-2021

- an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
- an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
- an ability to communicate effectively with a range of audiences*
- an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
- an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
- an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a,1.2b	1.3d	2.1a,2.1b	2.2a				
2	1.1b		1.3c					2.5b	2.6b
3		1.2a	1.3d		2.2b		2.4b	2.5a	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to CAD/CAM/CNC	CLO 1		Lecture presentation, in-class discussion	Reading [1]
2, 3	Geometric Transformations and Modeling	CLO 1,2	Quiz, Exercises	Lecture presentation, in-class discussion	Reading [1] , [2]
4, 5, 6	Mathematical representations of Curves, surfaces, Solids	CLO 1, 2	Quiz, Exercises	Lecture presentation, in-class discussion	Reading [1] , [2]
7	CAD/CAM Data Exchange	CLO 1		Lecture presentation, in-class discussion	Reading [1] , [2]
8-9	Midterm				
10-11	Numerical Control Systems	CLO 2, 3	Quiz, exercises	Lecture presentation, in-class discussion	Reading [1]
12-13	CNC Machines	CLO 2, 3	Quiz, exercises	Lecture presentation, in-class discussion	Reading [2]
14-15-16	NC programming	CLO 2, 3	Quiz, Exercises	Lecture presentation, in-class discussion	Reading [3]
17	Computer-Aided Process Planning	CLO 2	Exercises	Lecture presentation, in-class discussion	Reading [3]
8 weeks	CAD/CAM/CNC Lab	CLO 3	Assignments	Practice	Reading [4]
18	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
Exercises, Quizzes, Home works (10%)	Quiz, exercises 60% Pass	Quiz, exercises, HW 60% Pass	
Lab (20%)			Practice 60% Pass
Midterm exam (30%)	60% Pass	60% Pass	
Final exam (40%)		60% Pass	60% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:		HW/Assignment:	
Date:		Evaluator:	
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal	10		

content			
Introduction demonstrates thorough knowledge of relevant background and prior work	10		
Analysis and discussion demonstrate good subject mastery	35		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.

Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: April 13th, 2022

Ho Chi Minh City, 13/04/2022
Dean of School of Industrial Engineering
and Management

(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: PRODUCT DESIGN AND DEVELOPMENT

Course Code: **IS034IU**

1. General information

<i>Course designation</i>	Product Design and Development course introduces to the students the role of multiple functions in creating a new product (e.g. marketing, finance, industrial design, engineering, production) as well as tools and methods for product design and development.
<i>Semester(s) in which the course is taught</i>	5
<i>Person responsible for the course</i>	Dr. Dao Vu Truong Son
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, Exercises, Assignment.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 Private study including examination preparation, specified in hours ³¹ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Nil

³¹ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	Product Design and Development course introduces to the students the role of multiple functions in creating a new product (e.g. marketing, finance, industrial design, engineering, production) as well as tools and methods for product design and development. Highlight of the course is the project in which the students will design a new product and produce a prototype version of it. Project ideas come from the students in the class and project teams are formed based on expressed student preferences. Throughout the project, the students will apply their learned principles and methods of product development in a realistic context. The course also enables the students to coordinate interdisciplinary tasks in order to achieve a common objective.																														
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<i>Examination forms</i>	Practice, Writing questions																														
<i>Study and examination requirements</i>	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>																														
<i>Reading list</i>	Karl T. Ulrich & Steven D. Eppinger, Product design & development – 5th Edition, McGraw-Hill, 2012.																														

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-6) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2		x					
3			x	x			
4					x	x	

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
2		1.2b	1.3c	2.1a 2.1b			2.4a	2.5a	
3	1.1b 1.1c		1.3a 1.3c					2.5b	2.6a 2.6b
4	1.1c	1.2a	1.3b 1.3d		2.2b		2.4b	2.a	2.6a

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Product design & Development	1	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].1
2	Identify Customer needs	1, 2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].2
3	Project selection Product planning	2,3	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1] 3
4	Product specifications	1, 2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1] 4
5	Product architecture.	1, 2	Exercises, HW, Quiz	Lecture, Discussion, HW	[1] 5

				Inclass-Quiz	
6,7	Concept generation/selection	1, 2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1] 6,7
8	Review				
9	Midterm				
10	Concept Testing	1,2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].8
11	Prototyping	1,2	Exercises, HW, Quiz	Lecture, Discussion, Inclass-Quiz	[1].9
12	Industrial design/Design for Manufacturing	3, 4	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].10
13	Product development economics	3,4	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].11
14	Project presentation	3,4			
18	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Project (30%)			50% Pass	50% Pass
Midterm exam (30%)	60% Pass	60% Pass		
Final exam (40%)		60% Pass	60% Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (65%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	35		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		

Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (5%)		05	
TOTAL SCORE		100	

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.
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Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

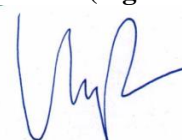
Source: Association of American Colleges and Universities

6. Date revised: April 15, 2022

Ho Chi Minh City, 15/04/2022

Dean of School of Industrial Engineering
and Management

(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

**Course Name: MANAGEMENT INFORMATION SYSTEMS with
ENTERPRISE RESOURCES PLANNING APPLICATIONS**

Course Code: **IS040IU**

1. General information

<i>Course designation</i>	<i>This subject will provide a broad introduction to business processes, information communication in the organizations, and systems to manage an organization's information resources. The course comes along with a computer software (SAP) to practice, through which students learn about database concepts and business processes integration, emphasizing the Internet based business models to get a competitiveness of global based business environments.</i>
<i>Semester(s) in which the course is taught</i>	1
<i>Person responsible for the course</i>	Dr. Tran Duc Vi
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson, project, lab practices.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.):37.5 Private study including examination preparation, specified in hours ³² : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None

³² When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	Students will be provided with skills of using software to manage different processes in the enterprise, in order to manage and plan for resources in the enterprise, and be exposed to case studies from outside the classroom. Through this unit, students will gain a deep appreciation for the role of enterprise systems in efficiently managing processes from multiple functional perspectives. Students will be able to apply the real-world concepts discussed upon entering the workforce and will be better prepared to succeed in their careers.									
<i>Course learning outcomes</i>	<p>Upon the successful completion of this course students will be able to:</p> <table border="1"> <thead> <tr> <th>Competency level</th> <th>Course learning outcome (CLO)</th> </tr> </thead> <tbody> <tr> <td>Knowledge</td> <td>CLO1. Describe the key processes in the firms supported by modern ERP systems. CLO2. Explain the roles of ERP systems in managing and planning resources and information system in the firm.</td> </tr> <tr> <td>Skill</td> <td>CLO3. Carry out actions to apply the concepts covered in the text to real-world situations and to the running case study used in their hands-on exercises, cooperate in group work to complete exercises.</td> </tr> <tr> <td>Attitude</td> <td>CLO4. Reason around ethical and privacy issues in information system control and apply ethical practices.</td> </tr> </tbody> </table>		Competency level	Course learning outcome (CLO)	Knowledge	CLO1. Describe the key processes in the firms supported by modern ERP systems. CLO2. Explain the roles of ERP systems in managing and planning resources and information system in the firm.	Skill	CLO3. Carry out actions to apply the concepts covered in the text to real-world situations and to the running case study used in their hands-on exercises, cooperate in group work to complete exercises.	Attitude	CLO4. Reason around ethical and privacy issues in information system control and apply ethical practices.
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Attitude	CLO4. Reason around ethical and privacy issues in information system control and apply ethical practices.									

<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>			
	Weight: lecture and practice session			
	Teaching levels: I (Introduce); T (Teach); U (Utilize)			
	Topic	Content	Weight (hour)	Level
	1. Introduction to Business processes and Enterprise system	- Organizational Structure - Business Processes - Enterprise Information System - Introduction to ERP SAP - SAP Logging in and Navigation	3	I
	2. Sales & Distribution	- Fulfillment process and Key documents (Inquiry, Quotation, SO, PL, Customer Invoice) - Customer Relation Management	1	I, T
		SAP Lab 1: Sales and Distribution (SD) – Case Study	2	T, U
	3. Production Planning	- Production strategies and process - Key documents (Planned Order, BOM, Production Order)	1	I, T
		SAP Lab 2: Production Planning (PP) – Case Study	2	T, U
	4. Inventory and Warehouse Management (IWM)	- Goods movement in IM and their financial impacts - Key processes in WM	1	I, T
		SAP Lab 3: Warehouse Management (WM) and Inventory Management (IM) – Case study	2	T, U
	Mini-project 1: ERP Implementation Project Management	- Introduction to Project System (PS) - Case study - EITHER Seminar or Corporate visit about Implementing ERP in Business OR Practice project planning and execution	6	I, T, U
	Revision		3	
	Midterm Exam			
	5. Material Planning	- MRP types and process - MRP data and key documents	1	I, T
		SAP Lab 4: Material Requirement Planning (MRP) – Case study	2	T, U
	6. Procurement	- Procurement process and Key documents (Purchase Requisition, PO, Vendor Invoice) - Supplier Relation Management	1	I, T
		SAP Lab 5: Purchasing (MM) – Case Study	2	T, U
	7. Financial Accounting and Reporting	- Intro to Financial Accounting - Financial reporting throughout procurement process (AR/AP, SO, COGS, Invoices)	2	I, T
	Mini-project 2: Integrated Processes – Global SCM	- Review Integrated end-to-end process (From SD to Accounting)	4	I, T, U

		- Divide groups into Buyers & Sellers in different countries - Practice executing end-to-end processes on SAP.		
	Mini-project 3: ERP Business Simulation	- Introduction to ERPsim - Divide groups to play the Manufacturing, Logistics, and Retail Game (more info here)	3	I, T, U
	Project presentation	The groups present about one of the 3 mini-projects.	6	
	Review		3	
Final Exam				
<i>Examination forms</i>	Multiple-choice questions, short-answer questions			
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 70 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.			
<i>Reading list</i>	[1] Magal, Simha R., and Jeffrey Word. Essentials of business processes and information systems. Wiley Publishing, 2009. [2] Magal, Simha R., and Jeffrey Word. Integrated business processes with ERP systems. Wiley Publishing, 2011 (main textbook). [3] SAP ERP 6.0 with Global Bike Inc practice case, supported by the SAP University Alliances.			

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-7) is shown in the following table:

CLO	PLO/SLO						
	1	2	3	4	5	6	7
1			x				
2			x				
3					x		
4				x			

ABET_Student Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

8. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
9. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental,

and economic factors

10. *an ability to communicate effectively with a range of audiences*
11. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
12. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
13. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
14. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	1. Introduction to Business processes and Enterprise system	CLO 1, 2	Quiz	Lecture	Reading [1] – Chap 1 & 2 Reading [2] – Chap 1 & 2
2	2. Sales & Distribution	CLO 1, 3	Homework	Lecture Software Demonstration	Reading [1] – Chap 4 Reading [2] – Chap 5
3	3. Production Planning	CLO 1, 3	Homework	Lecture Software Demonstration	Reading [1] – Chap 5 Reading [2] – Chap 6
4	4. Inventory & Warehouse Management (IWM)	CLO 1, 3	Homework	Lecture Software Demonstration	Reading [2] – Chap 7
5-6	Mini-project 1: ERP Implementation Project Management	CLO 1, 2, 3, 4	Quiz Report	Lecture In-class Discussion Seminar/Corporate visit (optional)	Contact business partner
7	Midterm Review	CLO 1, 2, 3, 4	Quiz	In-class Discussion	
8-9	Midterm				
10	5. Material Planning	CLO 1, 3	Homework	Lecture Software Demonstration	Reading [2] – Chap 8
11	6. Procurement	CLO 1, 3	Homework	Lecture Software Demonstration	Reading [1] – Chap 3 Reading [2] – Chap 4
12	7. Financial Accounting and Reporting Mini-project 2: Integrated Processes – Global SCM	CLO 1, 2, 3, 4	Quiz	Lecture	Reading [1] – Chap 6 Reading [2] – Chap 3 & 9
13	Mini-project 2 (con't)	CLO 1, 2, 3, 4	Report	In-class Discussion Software	Reading [2] – Chap 9

				Demonstration	Reading [3]
14	Mini-project 3: ERP Business Simulation	CLO 1, 2, 3, 4	Report	Lecture In-class Discussion Software Demonstration	To be given by SAP Uni Alliance after purchasing license
15-16	Project Presentation	CLO 1, 2, 3, 4	Presentation Materials and Report	Project Presentation	
17	Final Review				
18	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class assignment (10%)	Quiz 60% Pass	Quiz 60% Pass		
Group mini projects (20%)		Mini project 1,2,3 50% Pass	Mini project 1,2,3 50% Pass	Mini project 1,2,3 50% Pass
Midterm exam (30%)	Q1 50% Pass	Q2 50% Pass	Q3 50% Pass	Q4 50% Pass
Final exam (40%)	Q1 50% Pass	Q2 50% Pass	Q3 50% Pass	Q4 50% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description

5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: This rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1

Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: February 10, 2022

Ho Chi Minh City, 10/02/2022

Head of School of Industrial Engineering and Management

(Signature)

Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: Facility Layout

Course Code: **IS032IU**

1. General information

<i>Course designation</i>	This course focuses on the fundamentals of the design, layout, and location of industrial and non manufacturing facilities. Selection of machines and material handling equipment and their efficient arrangement. Emphasis on quantitative methods. Warehouse layout. Facility location theory
<i>Semester(s) in which the course is taught</i>	5
<i>Person responsible for the course</i>	Dr. Dao Vu Truong Son
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, Exercises, Assignment
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 Private study including examination preparation, specified in hours ³³ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Nil
<i>Course objectives</i>	Understand the fundamentals of the design, layout, and location of industrial and nonmanufacturing facilities. Selection of machines and material handling equipment and their efficient arrangement. Emphasis on quantitative methods. Warehouse layout. Facility location theory

³³ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:		
	Competency level	Course learning outcome (CLO)	
	Knowledge	CLO1. Understand the fundamental and advanced concepts in the design, layout, and location of industrial and nonmanufacturing facilities. CLO2. Know how to select machines and material handling equipment and their efficient arrangement.	
	Skill	CLO3. Use Excel to solve facility location problems	
Attitude	CLO4. Students will have positive attitude in both self-learning and group project with other disciplines related to port planning and design, especially solving related problems.		
<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (3 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Introduction to Facilities Planning.	3	I, T
	Product and Process Design	6	I, T
	Flow systems, activity relationships, and space requirement	6	I, T
	Plant Layout, Inspection Systems in Design	6	T, U
	Manufacturing & warehouse operations and material handling systems	6	T, U
	Single & Multi-Facility Location models	3	T, U
Machine Layout Models	3	T, U	
Warehouse and Order Picking Systems	3	T, U	
<i>Examination forms</i>	Practice, Writing questions		
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
<i>Reading list</i>	[1] Tompkins, J.A., White, J.A., et al., (2002), Facilities Planning, 3rd Edition, John Wiley and Sons. [2] R.L., Francis, L. F., McGinnis, J.A., White, (1992), Facility Layout and Location: an Analytical Approach, 2nd edition, Prentice-Hall, Inc., Englewood Cliffs, N.J.		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-6) is shown in the following table:

ILO							
CLO	1	2	3	4	5	6	7
1	x						
2		x					
3			x	x			
4					x	x	

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-4) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
2		1.2b	1.3c	2.1a 2.1b			2.4a	2.5a	
3	1.1b 1.1c		1.3a 1.3c					2.5b	2.6a 2.6b
4	1.1c	1.2a	1.3b 1.3d		2.2b		2.4b	2.a	2.6a

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Facilities Planning.	1		Lecture, Discussion,	[1].1 [2]
2,3	Product and Process Design.	1, 2	Exercises	Lecture, Discussion	[1].2-3
4, 5	Flow systems, activity relationships, and space requirement	2,3	Exercises	Lecture, Discussion, HW Inclass-Quiz	[1] 4,5 [2]
6, 7	Plant Layout, Inspection Systems in Design	2,3	Exercises	Lecture, Discussion, HW Inclass-Quiz	[1]. 2,3, 6, 7, 9 [2]. 2
8	Review	2	Exercises		
9	Midterm				

10,11	Manufacturing & warehouse operations and material handling systems	4	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1]. 9
12	Single & Multi-Facility Location models	3, 4	Exercises, HW, Quiz	Lecture, Discussion, Inclass-Quiz	[1]. 10
13	Machine Layout Models	3, 4	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1] 22 [2]. 8
14	Warehouse and Order Picking Systems	3	Exercises	Lecture,	[1] 21 [2] 9
15	Project Presentation	3,4			
16	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class assignment (10%)	HW 1 60% Pass	HW2 60% Pass	HW3-HW4 60% Pass	
Group projects (20%)				Group project 80% Pass
Midterm exam (30%)	60% Pass	60% Pass		
Final exam (40%)		60% Pass	60% Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (65%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	35		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (5%)	05		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: April 15, 2022

Ho Chi Minh City, 15/04/2022

**Dean of School of Industrial Engineering
and Management**

(Signature)

Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: Quality Management

Course Code: **IS025IU**

1. General information

<i>Course designation</i>	<i>Introduction to the principles of quality management, with an emphasis on cross-functional problem solving. This course will provide a basic understanding of the philosophy, conceptual frameworks, and the tools of the Total Quality Management.</i>
<i>Semester(s) in which the course is taught</i>	1, 2
<i>Person responsible for the course</i>	M.Sc. Duong Vo Nhi Anh
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson, project, seminar.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 Private study including examination preparation, specified in hours ³⁴ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Nil
<i>Course objectives</i>	Understand different kinds of quality tools, PDCA, ... Apply quality tools in problem solving, quality improvement to reduce cost, quality of products

³⁴ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:		
	Competency level	Course learning outcome (CLO)	
	Knowledge	CLO 1. Understand different kinds of quality and the background and philosophies of quality CLO 2. Understand method to analyze existing problem and identify different kinds of solutions	
	Skill	CLO 3. Apply approaches used in implementing quality tools	
	Attitude	CLO 4. Apply for improve standards, quality of products	
<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (3 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Introduction to Quality Management	1	I, T
	Why Total Quality Management Definitions and basic principles	2	T, U
	Quality Control: Measuring and process analysis	1	T, U
	Quality Improvement & Problem Solving Method-SCRA	2	T
	Quality tools: ISO, ...	2	T, U
	SPC/SQC: control charts	2	T
Stabilizing and improving a process with control charts	1	T, U	
Variables and attribute control charts	1	T, U	
<i>Examination forms</i>	Multiple-choice questions, short-answer questions		
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
<i>Reading list</i>	[1] D.L. Goetsch and Stanley B. Davis, Quality Management- 5th edition, Prentice Hall, 2006. [2] Howard S. Gitlow et. al., Quality Management - 3rd edition, McGraw Hill, 200 [3] Evans, Managing for quality and performance excellence -7th edition, Cengage Learning. [4] Winston, Operations Research – 4th edition, Cengage Learning. [5] Barry Render, Quantitative analysis for management - 9th edition, Prentice Hall, 2006		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2	x	x	x				
3						x	
4				x			x

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-4) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes									
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6	
1		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a					
2	1.1c	1.2a 1.2b	1.3a 1.3c 1.3d	2.1a 2.1b	2.2a		2.4a	2.5a		
3		1.2a	1.3d		2.2b		2.4b	2.5a		
4	1.1a 1.1b 1.1c		1.3c			2.3a	2.4c	2.5b	2.6b	

3. Planned learning activities and teaching methods

Week	Topic	CLOs	Assessment	Learning activities
1	Introduction to Quality Management Fundamentals of quality: process basics, types of quality, relationship between quality and cost and productivity.	CLO 1, 2	- Quiz	- Group forming. - Class discussion - Read book & lecture 2.

2	Why Total Quality Management Definitions and basic principles How to realize TQM: three components of TQM, quality and global competitiveness, environment of today. Why Total Quality Management in a Knowledge-Based Economy? Breaking out of the negative circle	CLO 1, 2	- Quiz - Homework	- Class discussion - Read book & lecture 3.
3	Introducing the Three Pillars of TQM Quality Planning:	CLO 1, 2	- Quiz /HW	- Class discussion - Read book & lecture 4.
4	Behavioral Component of TQM Establishing a quality culture, conditions for a successful TQM policy, increasing the quality of cooperation processes, TQM & the strategy of change, How can the behavioral component be developed?	CLO 1, 2	- Quiz /HW	- Class discussion - Read book & lecture 4.
5	Management components of TQM: Role of Top Management/ Task-oriented meetings. Roadmap to business excellence	CLO 1, 2	- Homework	- Class discussion - Read book & lecture 5.
6	Technical components of TQM: Quality Systems and Quality Assurance Quality tools: ISO, ...	CLO 1, 2	- Quiz /HW	- Class discussion - Read book & lecture 6.
7	Review	CLO 1, 2, 3	- Quiz /HW	- Class discussion - Read book & lecture 6.
8	Technical components of TQM (cont) ISO and other statistical tools. Collection and presentation of data	CLO 1, 2, 3	- Quiz /HW	- Class discussion
Midterm exam				
9	SPC/SQC: control charts Stabilizing and improving a process with control charts. Variables and attribute control charts. How to read a control chart: 7 rules.	CLO 1, 2, 3	- Quiz /HW	- Class discussion - Read book & lecture 7.
10	SPC/SQC: control charts Stabilizing and improving a process with control charts. Variables and attribute control charts. How to read a control chart: 7 rules.	CLO 1, 2, 3	- Quiz /HW	- Class discussion - Read book & lecture 8.
11	SPC/SQC: control charts Stabilizing and improving a process with control charts. Variables and attribute control charts. How to read a control chart: 7 rules.	CLO 1, 2, 3	- Quiz /HW	- Class discussion - Read book & lecture 8.
12	Standard Operating	CLO 1, 2, 3	- Quiz /HW	- Class discussion - Read book &

	Procedures (SOP) Quality Function Deployment (QFD)			lecture 8.
13	Standard Operating Procedures (SOP) Quality Function Deployment (QFD)	CLO 1, 2, 3	- Quiz /HW	- Class discussion - Read book & lecture 9.
14	Group presentation	CLO 1, 2, 3, 4	- Quiz /HW	- Class discussion
15	Review for Final Exam	CLO 1, 2, 3, 4	- Quiz /HW	- Class discussion
	Final Examination			

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Quizzes and homework (15%)	60%Pass	60%Pass	60%Pass	60%Pass
Project (15%)	60%Pass	60%Pass	60%Pass	60%Pass
Midterm Exam (30%)	60%Pass	60%Pass	60%Pass	60%Pass
Final Exam (40%)	60%Pass	60%Pass	60%Pass	60%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			

Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

			identified clearly.	
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Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: July 12, 2022

Ho Chi Minh City, 12/07/2022
**Dean of School of Industrial Engineering
and Management**
(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: Project Management

Course Code: IS026IU

1. General information

<i>Course designation</i>	This course is developed to provide the principal concept on project management which was characterized by the project management body of knowledge guide (PMBOK Guide). This guide emphasizes the five project process groups of initiating, planning, executing, controlling and closing, and the nine knowledge areas of project integration, scope, time, cost, quality, human resources, communication, risk, and procurement management.
<i>Semester(s) in which the course is taught</i>	4
<i>Person responsible for the course</i>	Tran Van Ly
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, homework.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, etc.): 37.5 Private study including examination preparation, specified in hours ³⁵ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None

³⁵ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	Students will be provided with knowledge and skills of constructing the network (AON & AOA), GANNT Chart, solving the network; Resource allocation, resource loading & levelling; Project budgeting & cost estimation, risk management; Project quality management; Project human resource management; Project procurement management; Project executing, monitoring & control to closing the project	
<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	<p>CLO1. Able to align the project to the organization's strategic plans and business justification throughout its lifecycle; to identify project goals, constraints, deliverables, performance criteria, control needs, and resource requirements in consultation with stakeholders.</p> <p>CLO2. Able to manage the scope, cost, timing, and quality of the project, at all times focused on project success as defined by project stakeholders</p> <p>Able to implement general business concepts, practices, and tools to facilitate project success.</p>
	Skill	CLO3. Work effectively in group projects in a specific context; combining the techniques to conduct practical cases. Respond to the needs of community and industrial sectors
Attitude	<p>CLO4. Able to apply appropriate legal and ethical standards.</p> <p>Adapt project management practices to meet the needs of stakeholders from multiple sectors of the economy (i.e. consulting, government, arts, media, and charity organizations); Identify and follow strictly ethical disciplines in project management</p>	

<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (3 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Lecture 1: Introduction to Project Management	1	I, T
	Lecture 2: Project management processes for a project	1	I, T
	Lecture 3: Work breakdown structure	1	I, T
	Lecture 4: Project scheduling	1	I, T
	Lecture 5: Resource allocation	1	I, T
	Lecture 6: Logical Framework	2	I, T
	Lecture 7: Project cost management	1	I, T
	Lecture 8: Project risk management	1	I, T
	Lecture 9: Project quality management	1	I, T
	Lecture 10: Project human resource management	1	I, T
Lecture 11: Project procurement management	1	I, T	
Lecture 12: Project executing, monitoring & control.	1	I, T	
Lecture 13: Project closing	1	I, T	
<i>Examination forms</i>	Short-answer questions, exercises		
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
<i>Reading list</i>	[1] Book name: A Guide to the project management body of knowledge (PMBOK® Guide). 5 th Edition, Newtown Square, Pa. : Project Management Institute, Inc. [2] Project management: A managerial approach / Jack R. Meredith, Samuel J. Mantel. 7 th Edition, Hoboken, N.J. : Wiley ; Chichester : John Wiley [distributor], 2009. [3] The project management life cycle/ Jason West land. Kogan Page Limited, 2006		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

	ILO						
CLO	1	2	3	4	5	6	7
1		x					

2		x					
3						x	
4				x			

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2b	1.3c	2.1a 2.1b			2.4a	2.5a	
2		1.2b	1.3c	2.1a 2.1b			2.4a	2.5a	
3		1.2a	1.3d		2.2b		2.4b	2.5a	
4	1.1b		1.3c					2.5b	2.6b

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Lecture 1: Introduction to Project Management, project life cycle and organization	1 1.2.b		Lecture, Group work	[1].
2	Lecture 2: Project management processes for a project - Common project management process interactions. - Project management process groups. - Initiating process group - Planning process group	1 1.2.b	HW 1	Lecture, Group work	[1].
3	Lecture 3: Work breakdown structure	1,3,4 1.2.b 1.2.a/1.3. d	HW 2	Lecture, Group work	[1].
4	Lecture 4: Project scheduling. - Constructing the network: AON & AOA - Gantt chart - Solving the network - Using Microsoft Project software	1,3,4 1.2.b 1.2.a/1.3. d	HW 3	Lecture, Group work	[1].

5	Lecture 5: Resource allocation <ul style="list-style-type: none"> - Critical path method – Crashing a project - Resource allocation problem - Resource loading - Resource leveling - Constrained resource scheduling 	1,3,4 1.2.b 1.2.a/1.3.d 1.1.b	HW 4	Lecture, Group work	[1].
6 & 7	Lecture 6: Logical Framework Approach (LFA)	3 1.2.a/1.3.d		Lecture, Group work	[1].
8	Review for Midterm				
Midterm					
9	Lecture 7: Project cost management Project budgeting & Cost estimation <ul style="list-style-type: none"> - Top-Down budgeting - Bottom-Up budgeting - Improving the process of cost estimation 	2, 3, 4 2.5a 1.2.a/1.3.d 1.1.b	HW 5	Lecture, Group work	[1].
10	Lecture 8: Risk management. <ul style="list-style-type: none"> - Risk management planning - Risk identification - Risk analysis - Risk monitoring and control - Using Crystal Ball software 	2, 3, 4 2.5a 1.2.a/1.3.d 1.1.b	HW 6	Lecture, Group work	
11	Lecture 9: Project quality management <ul style="list-style-type: none"> - Plan quality - Perform quality assurance - Perform quality control 	2, 3, 4 2.5a 1.2.a/1.3.d 1.1.b	HW 7	Lecture, Group work	[1].
12	Lecture 10: Project human resource management <ul style="list-style-type: none"> - Develop human resource plan - Acquire project team - Develop project team - Manage project team 	2, 3, 4 2.5a 1.2.a/1.3.d 1.1.b	HW 8	Lecture, Group work	[1].
13	Lecture 11: Project procurement management <ul style="list-style-type: none"> - Plan procurements - Conduct procurements - Administer procurements - Close procurements 	2, 3, 4 2.5a 1.2.a/1.3.d 1.1.b	HW 9	Lecture, Group work	[1].
14	Lecture 12: Project executing, monitoring & control.	2, 3, 4 2.5a	HW 10	Lecture, Group work	[1].
15	Lecture 13: Project closing Project Presentation Review for Final Exam	2, 3, 4 2.5a 1.2.a/1.3.d 1.1.b		Problems solving Group work	[1].
Final exam					

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Homework exercises (30%)	HW1-2 50% Pass	HW4, HW5, HW6 50% Pass	HW7-8 50% Pass	HW9-10 50% Pass
Midterm exam (30%)	Q1 50% Pass	Q2 50% Pass	Q3, Q4 50% Pass	
Final exam (40%)	Q1 50% Pass	Q2 50% Pass	Q3, Q4 50% Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: Aug 23, 2022

Ho Chi Minh City, 23/08/2022

**Dean of School of Industrial Engineering
and Management**

(Signature)

Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

**Course Name: LOGISTICS ENGINEERING AND
SUPPLY CHAIN DESIGN**

Course Code: **IS078IU**

1. General information

<i>Course designation</i>	<i>This course describes components and structure of a supply chain system. It covers all supply chain network design problems from location-allocation of the facilities, evaluation of design options, calculating the capacity of the facilities, analyzing centralized – decentralized configuration. The subject also introduces some coordination framework that link efficiently supply chain components together. Other topics such as aggregation configuration, smart pricing, and transportation system design are also considered.</i>
<i>Semester(s) in which the course is taught</i>	2
<i>Person responsible for the course</i>	Assoc. Prof. Nguyen Van Hop
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson, project
<i>Workload (incl. contact hours, self-study hours)</i>	<i>(Estimated) Total workload: 137.5</i> <i>Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5</i> <i>Private study including examination preparation, specified in hours³⁶: 100</i>
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Deterministic Models in OR

³⁶ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	<p>This course aims to help students to:</p> <ul style="list-style-type: none"> - Understanding of key elements and structure of a Supply Chain System. - Understanding how to design an effective supply chain. - Formulating and solving logistics and supply chain design problems with optimization techniques. 									
<i>Course learning outcomes</i>	<p>Upon the successful completion of this course students will be able to:</p> <table border="1"> <thead> <tr> <th>Competency level</th> <th>Course learning outcome (CLO)</th> </tr> </thead> <tbody> <tr> <td>Knowledge</td> <td> <p>CLO1. Understanding of concepts, key points, and primary challenges of supply chain design based on Engineering, Scientific, and Economic knowledge. Able to distinguish different issues and problems in logistics and supply chain design with the applications of new development and technologies in engineering and natural sciences based on investigating databases, guidelines, and safety regulations. Students are able to identify non-technical impacts of engineering actions and aware of the repercussions their activities have on various areas of life and consider these when making decisions.</p> </td> </tr> <tr> <td>Skill</td> <td> <p>CLO2. Know how to identify, formulate and solve different logistics and supply chain design problems by using optimization and advanced techniques from the collected data and reviewed literature. Know how to solve the complex engineering problems by a holistic and systematic approach using computer-based solutions such as CPLEX, LINGO, Python, Matlab and the knowledge of natural sciences, mathematics and engineering. Students are also able conducting experiments and developing equipment and processes of engineering for the designed system.</p> <p>CLO3. Students are able to solve practical problems, conduct detailed research, conduct experiments and analyze the solutions by evaluating, planning, choosing and applying adequate methods of modeling, simulation, design and implementation of technical and economic systems. Student can develop, optimize and implement application-oriented solutions using the knowledge of natural sciences, mathematics and engineering.</p> </td> </tr> <tr> <td>Attitude</td> <td> <p>CLO4. Develop teamworking (leadership, organize, plan, and manage the projects), soft and professional (communication, decision making) skills and apply ethical practices to handle issues in the working environment.</p> </td> </tr> </tbody> </table>		Competency level	Course learning outcome (CLO)	Knowledge	<p>CLO1. Understanding of concepts, key points, and primary challenges of supply chain design based on Engineering, Scientific, and Economic knowledge. Able to distinguish different issues and problems in logistics and supply chain design with the applications of new development and technologies in engineering and natural sciences based on investigating databases, guidelines, and safety regulations. Students are able to identify non-technical impacts of engineering actions and aware of the repercussions their activities have on various areas of life and consider these when making decisions.</p>	Skill	<p>CLO2. Know how to identify, formulate and solve different logistics and supply chain design problems by using optimization and advanced techniques from the collected data and reviewed literature. Know how to solve the complex engineering problems by a holistic and systematic approach using computer-based solutions such as CPLEX, LINGO, Python, Matlab and the knowledge of natural sciences, mathematics and engineering. Students are also able conducting experiments and developing equipment and processes of engineering for the designed system.</p> <p>CLO3. Students are able to solve practical problems, conduct detailed research, conduct experiments and analyze the solutions by evaluating, planning, choosing and applying adequate methods of modeling, simulation, design and implementation of technical and economic systems. Student can develop, optimize and implement application-oriented solutions using the knowledge of natural sciences, mathematics and engineering.</p>	Attitude	<p>CLO4. Develop teamworking (leadership, organize, plan, and manage the projects), soft and professional (communication, decision making) skills and apply ethical practices to handle issues in the working environment.</p>
Competency level	Course learning outcome (CLO)									
Knowledge	<p>CLO1. Understanding of concepts, key points, and primary challenges of supply chain design based on Engineering, Scientific, and Economic knowledge. Able to distinguish different issues and problems in logistics and supply chain design with the applications of new development and technologies in engineering and natural sciences based on investigating databases, guidelines, and safety regulations. Students are able to identify non-technical impacts of engineering actions and aware of the repercussions their activities have on various areas of life and consider these when making decisions.</p>									
Skill	<p>CLO2. Know how to identify, formulate and solve different logistics and supply chain design problems by using optimization and advanced techniques from the collected data and reviewed literature. Know how to solve the complex engineering problems by a holistic and systematic approach using computer-based solutions such as CPLEX, LINGO, Python, Matlab and the knowledge of natural sciences, mathematics and engineering. Students are also able conducting experiments and developing equipment and processes of engineering for the designed system.</p> <p>CLO3. Students are able to solve practical problems, conduct detailed research, conduct experiments and analyze the solutions by evaluating, planning, choosing and applying adequate methods of modeling, simulation, design and implementation of technical and economic systems. Student can develop, optimize and implement application-oriented solutions using the knowledge of natural sciences, mathematics and engineering.</p>									
Attitude	<p>CLO4. Develop teamworking (leadership, organize, plan, and manage the projects), soft and professional (communication, decision making) skills and apply ethical practices to handle issues in the working environment.</p>									

<p><i>Content</i></p>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (3 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Introduction</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Network Design</td> <td>2</td> <td>I, T, U</td> </tr> <tr> <td>Distribution Network Design</td> <td>1</td> <td>I, T, U</td> </tr> <tr> <td>Capacity Design</td> <td>2</td> <td>I, T, U</td> </tr> <tr> <td>Supply contracts</td> <td>2</td> <td>I, T, U</td> </tr> <tr> <td>Aggregation in Supply Chain</td> <td>2</td> <td>I, T,U</td> </tr> <tr> <td>Smart pricing & revenue management</td> <td>2</td> <td>I, T, U</td> </tr> <tr> <td>Transportation Design</td> <td>2</td> <td>I, T, U</td> </tr> </tbody> </table>	Topic	Weight	Level	Introduction	1	I, T	Network Design	2	I, T, U	Distribution Network Design	1	I, T, U	Capacity Design	2	I, T, U	Supply contracts	2	I, T, U	Aggregation in Supply Chain	2	I, T,U	Smart pricing & revenue management	2	I, T, U	Transportation Design	2	I, T, U
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Aggregation in Supply Chain	2	I, T,U																										
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Transportation Design	2	I, T, U																										
<p><i>Examination forms</i></p>	<p>Written Examination</p>																											
<p><i>Study and examination requirements</i></p>	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/ Examination: Students must have more than 50/100 points overall to pass this course.</p>																											
<p><i>Reading list</i></p>	<p>Textbooks:</p> <ul style="list-style-type: none"> - Chopra, S., and Meindl, P. (2016). Supply chain management: Strategy, Planning and Operation, 6th ed.. NY: Prentice Hall. - Simchi-Levi, D., Kaminsky, P., and Simchi-Levi, E. (2008). Designing and Managing the Supply Chain: Concepts, Strategies and Case Studies. Boston: McGraw-Hill/ Irwin. <p>References books:</p> <ul style="list-style-type: none"> - Mankiw NG (2011). Principles of Economics, 5th edition. South-Western Cengage Learning. - Simchi-Levi, D., Chen, X., Bramel, J. (2014). The Logic of Logistics Management. Springer Series in Operations Research and Financial Engineering. - M. Watson, S. Lewis, P. Cacioppi, J. Jayaraman, 2013. Supply Chain Network Design: Applying Optimization and Analytics to the Global Supply Chain. Pearson Education, FT Press, New Jersey. - I. Minis, V. Zeimpekis, G. Dounias, N. Ampazis, 2011. Supply Chain Optimization, Design, and Management: Advances and Intelligent Methods. Business Science Reference, Hershey, Newyork. - M.Govil, J.M. Proth, 2002. Supply Chain Design and Management: Strategic and Tactical Perspective. Academic Press, Sandiego, California. 																											

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1				x			x
2	x	x					
3		x				x	
4			x	x	x		

Intended Learning Outcomes (ILO)

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes									
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6	
1	1.1a, 1.1b, 1.1c		1.3c			2.3a	2.4c	2.5b	2.6b	
2		1.2a, 1.2b	1.3c, 1.3d	2.1a, 2.1b	2.2a		2.4a	2.5a		
3		1.2a, 1.2b	1.3c, 1.3d	2.1a, 2.1b			2.4a, 2.4b	2.5a		
4	1.1b, 1.1c		1.3a, 1.3b, 1.3c					2.5b	2.6a, 2.6b	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Lecture 1: Introduction to Supply Chain Design	1		Lecture Group forming. Class discussion Read book & lecture 2	

2	Lecture 2: Network Design	1, 2,3	Quiz/HW	Lecture Class discussion Read book & lecture 3.	
3	Lecture 3: Network Design	1, 2,3	Quiz/HW	Lecture Class discussion Read book & lecture 4.	
4	Lecture 4: Distribution Network Design	1, 2,3	Quiz/HW	Lecture Class discussion Read book & lecture 5.	
5	Lecture 5: Capacity Design	1, 2,3	Quiz/HW	Lecture Class discussion Read book & lecture 6.	
6	Lecture 6: Capacity Design	1,2,3	Quiz/HW	Lecture Class discussion Read book & lecture 7	
7	Lecture 7: Supply contracts	1, 2,3	HW	Lecture Class discussion	
	Midterm exam		Written Exam		
8	Lecture 8: Supply contracts	1,2,3	Quiz/HW	Lecture Class discussion Read book & lecture 9.	
9	Lecture 9: Aggregation in Supply Chain	1,2,3	Quiz/HW	Lecture Class discussion Read book & lecture 10.	
10	Lecture 10: Aggregation in Supply Chain	1, 2,3	Quiz/HW	Lecture Class discussion Read book & lecture 11	
11	Lecture 11: Smart pricing & revenue management	1,2,3	Quiz/HW	Lecture Class discussion Read book & lecture 12	
12	Lecture 12: Smart pricing & revenue management	1, 2,3	Quiz/HW	Lecture Class discussion Read book & lecture 13	
13	Lecture 13: Transportation Design	1, 2,3	Quiz/HW	Lecture Class discussion Read book & lecture 14	
14	Lecture 14: Transportation Design	1, 2,3	Quiz/HW	Lecture Class discussion	
15	Project presentation	3,4	Project	Group Presentation	
	Final exam		Written Exam		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
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Quizzes and homework (15%)	60% Pass	60% Pass	60% Pass	100% Pass
Project (15%)	60% Pass	60% Pass	60% Pass	100% Pass
Midterm Exam (30%)	60% Pass	60% Pass	60% Pass	90% Pass
Final Exam (40%)	60% Pass	60% Pass	60% Pass	90% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Semester Project Report			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Part 1. Problem (25%)			
Criterion 1: Problem Statement	10		
Criterion 2: Objectives of Study	5		
Criterion 3: Scope and Limitations	5		
Criterion 4: Literature Review	5		
Part 2. Proposed System Design and Solution (40%)			
Criterion 1: Proposed System	10		
Criterion 2: Proposed Solution	15		
Criterion 3: New Contribution	15		
Part 3. Results and Validation (35%)			
Criterion 1: Results	15		
Criterion 2: Validation	20		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: 10/5/2022

Ho Chi Minh City, 10/05/2022

**Dean of School of Industrial Engineering
and Management**

(Signature)

Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: Probabilistic Models in Operation Research

Course Code: **IS024IU**

1. General information

Course designation	<i>In this course, students typically study the application of probabilistic models and stochastic processes in the field of operations research. The course focuses on developing students' understanding of how uncertainty and randomness can be incorporated into mathematical models used in decision-making and optimization problems. Students learn various probabilistic modeling techniques, including Markov chains, queuing theory, decision analysis under uncertainty, and simulation methods. The course emphasizes the use of probabilistic models to analyze and solve real-world problems in operations research and related areas.</i>
Semester(s) in which the course is taught	1
Person responsible for the course	<i>Dr. Phan Nguyen Ky Phuc</i>
Language	English
Relation to curriculum	<i>Compulsory</i>
Teaching methods	<i>Lecture, lesson, project</i>
Workload (incl. contact hours, self-study hours)	<i>(Estimated) Total workload:137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.):37.5 Private study including examination preparation, specified in hours³⁷: 100</i>
Credit points	3 (5 ECTS)
Required and recommended prerequisites for joining the course	

³⁷ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

Course objectives	This course is to introduce the fundamental probabilistic models in operation research field. The course shows how a probabilistic system can be analyzed and come up with formulas. Topics to be covered include: random variable, discrete distribution, continuous distribution, joint distribution, expectation, Markov Chain, Poisson Process, queueing model, and reliability.																																
Course learning outcomes	Upon the successful completion of this course students will be able to:																																
	Competency level Knowledge	Course learning outcome (CLO) CLO1. Students are able to master the basic knowledge of modeling and calculating joint distributions of discrete and continuous system. CLO2. Students are able to master the basic knowledge of building the Markov Chain, find state space, and stability of the system CLO3. Students are able to master the basic knowledge of building the Markov Chain for the poison process, queueing models																															
	Skill	CLO4. Students are able to apply their knowledge and develop practical skills for solving problems, conducting experiments and developing equipment and processes of engineering by using MATLAB software																															
Content	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (4 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Introduction to discrete random variables</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Most common discrete distribution and their applications</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Joint distribution for discrete variable</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Markov Chain</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Exponential Distribution</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Poisson Process</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Queuing models: M/M/K, shoes side shop</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Reliability</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>MATLAB</td> <td>1</td> <td>U</td> </tr> </tbody> </table>			Topic	Weight	Level	Introduction to discrete random variables	2	I, T	Most common discrete distribution and their applications	2	I, T	Joint distribution for discrete variable	2	I, T	Markov Chain	2	I, T	Exponential Distribution	2	I, T	Poisson Process	2	I, T	Queuing models: M/M/K, shoes side shop	2	I, T	Reliability	2	I, T	MATLAB	1	U
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Examination forms	Written Exam																																
Study and examination requirements	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>																																

Reading list	Textbooks: [1] Sheldon M. Ross, Introduction to Probability Models, 2014, 11th edition.
	References: 1. A first course of Probability, 4 th ed, Sheldon M. Ross, Prentice Hall

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1 -7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	X						
2	X						
3	X						
4						X	

Intended Learning Outcomes

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
2		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
3		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
4		1.2a	1.3d		2.2b		2.4b	2.5a	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1 & 2	Introduction to discrete random variables	1		Lecture	
3 & 4	Most common discrete distribution	1	HW1	Lecture Think pair-	

	and their applications			share HW	
5&6	Joint distribution for discrete variable	1	Quiz1	Lecture Quiz	
7&8	Markov Chain	2	HW2	Lecture HW	
9	Midterm				
10 & 11	Exponential Distribution	3	HW3	Lab	
12	Poisson Process	3	Quiz2	Lecture Quiz	
13 & 14	Queuing models: M/M/K, shoes side shop	3	HW4	Lecture HW	
15	Reliability	2	Quiz3	Lecture HW Group Project	
16	MATLAB	4		- Lecture Quiz	
17	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class exercises/quizzes (10%)	Qz1 60%Pass		Qz3 60%Pass%Pass
Howework exercises (20%)	HW1 50%Pass	HW2 50%Pass	HW3 50%Pass	HW4 50%Pass
Midterm (30%)		60%Pass		
Final (40%)			60%Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:		HW/Assignment:	
Date:		Evaluator:	
	Max.	Score	Comments
Part 1..... (....%)			
Criterion 1:			
Criterion 2:			
Criterion 3:			
Criterion ...:			
Part 2..... (....%)			

Criterion 1 ...:			
Criterion ...:			
Part 3..... (....%)			
Criterion 1...:			
Criterion ...:			
Part (....%)			
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.

Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised:

Ho Chi Minh City, 2022
Dean of School of Industrial Engineering
and Management

(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: Simulation models in industrial engineering

Course Code: **IS028IU**

1. General information

<i>Course designation</i>	Modeling and analysis of industrial and service systems, modeling perspectives, discrete event and continuous simulation, model building using ARENA/SIMAN, statistical aspects of simulation.
<i>Semester(s) in which the course is taught</i>	7
<i>Person responsible for the course</i>	Dr. Pham Huynh Tram
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsive
<i>Teaching methods</i>	Lecture, project
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 190 Contact hours (lecture): 50 Private study including examination preparation, specified in hours ³⁸ : 140
<i>Credit points</i>	4 (3 lecture + 1 laboratory) (6.9 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Engineering Probability and Statistics
<i>Course objectives</i>	<ol style="list-style-type: none">1. Identify, formulate and solve complex problems in manufacturing and service systems by performing discrete-event system simulation and applying knowledge of statistics2. Use simulation as a tool in the process of engineering design to produce solutions that meet specified needs with consideration of economic factors.3. Conduct experimentation via simulation, analyze the data and draw valid conclusion4. Work effectively in group project

³⁸ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO1. Able to apply knowledge of statistics such as random distributions and hypothesis testing in different steps of a simulation study
	Knowledge	CLO2.1 Able to carry out simulation study of manufacturing or service cases following a standard procedure
	Skill	CLO2.2 Able to use Arena software as a tool to create a simulation model
	Knowledge	CLO2.3 Able to consider different system constraints, requirements and economic factors in a simulation study
	Skill	CLO3. Able to do experimentation in simulation in Arena, read and interpret the report results
	Attitude	CLO4.1 Able to collaborate and/or lead in a project team, plan tasks and meet project objectives
	Skill	CLO4.2 Able to write a technical report
Skill	CLO4.3 Able to give presentation before class	

<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (3 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Introduction to Design of Experiments <i>Strategy, applications, guidelines and basic principles</i>	1	I
	Review of Basic Statistical Methods <i>Sampling</i> <i>Inferences about the differences in means</i> <i>Inferences about the variances of normal distribution</i>	1	I
	Analysis of Variance <i>Single-factor analysis of variance Model adequacy checking Interpreting of the results</i> <i>Sample computer output</i> <i>Determining sample size Dispersion effects Regression approach</i> <i>Real economy application of a designed experiment</i>	1	I
	Experiments with Blocking Factors <i>Randomized block</i> <i>Latin square design</i> <i>Incomplete block designs</i>	2	T,U
	Factorial Experiments <i>Basic definitions and principles</i> <i>Two factors factorial design</i> <i>Blocking in factorial experiments</i>	1	T, U
	Two-level Factorial Designs <i>The 2² design, the 2³ design</i> <i>The general 2^k design</i> <i>Single replicate of the 2^k design</i>	1	T,U
	Factorial Experiments <i>Basic definitions and principles</i> <i>Two factors factorial design</i> <i>Blocking in factorial experiments</i>	1	T, U
Two-level Factorial Designs <i>The 2² design, the 2³ design</i> <i>The general 2^k design</i> <i>Single replicate of the 2^k design</i>	2	T, U	
Two-level Fractional Factorial Designs <i>One-half fraction of the 2^k design</i> <i>One quarter fraction of the 2^k design</i> <i>Blocking fractional factorials</i>	2	T,U	
Regression Modeling <i>Linear regression models Estimation of the parameters Hypothesis testing of the</i>	1	I	

	<i>parameters</i>		
	Response Surface Methodology <i>Method of steepest ascent</i> <i>Analysis of a second-order response surface</i> <i>Application to robust design</i>	2	I
<i>Examination forms</i>	Writing, project presentation		
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
<i>Reading list</i>	Textbooks: [1] Banks, J., Carson, J. S., Nelson, B. L., and Nicol, D. M., "Discrete-Event System Simulation", 4th edition, Prentice-Hall, 2005. [2] Kelton, W. D., Sadowski, R. P., and Sturrock, D. T., "Simulation with Arena", McGraw-Hill, New York (fourth edition), 2006. References: [3] Tayfur Altiok, Benjamin Melamed, "Simulation modeling and analysis with Arena", Academic Press (Elsevier) 2007 Software: ARENA Software version: 16.00 Licenses: Academic for students, unlimited		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-6) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2		x					
3						x	
4			x		x		

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
2		1.2b	1.3c	2.1a 2.1b			2.4a	2.5a	
3		1.2a	1.3d		2.2b		2.4b	2.5a	
4	1.1c		1.3a 1.3b						2.6a

3. Planned learning activities and teaching methods

Theory

Week	Content	CLOs	Assessment	Resources
1	Introduction	2.1	Project	Reading: Banks – Chapter 1 (Kelton – Chapter 1 Altiok – Chapter 1)
2	Simulation examples in a spreadsheet	2.1	Midterm	Reading: Banks – Chapter 2 (Kelton – Chapter 2)
3	Basics of discrete-event simulation	2.1		Reading: Banks – Chapter 3 Kelton – Chapter 2
4	Elements of Probability and Statistics	1		Reading: Banks-Chapter 5 Altiok- Chapter 3
5	Random Numbers	1	Midterm	Reading: Banks-Chapter 7 (Altiok- Chapter 4)
6	Random variates	1	Midterm	Reading: Banks-Chapter 7 (Altiok- Chapter 4)
7	Review			
Midterm exam				
8&9	Input modeling	1 2.1	Project Final	Reading: Banks – Chapter 9 Kelton – Chapter 4.6 Altiok – Chapter 7

9&10	Verification and validation	1 2.1	Project Final	Reading: Banks – Chapter 10 Kelton – Chapter 4.5 Altiok – Chapter 8
11&12	Absolute Output analysis	1 2.1 2.3	Project Final	Reading: Banks – Chapter 11 Kelton – Chapter 7 Altiok – Chapter 9
13	Relative Output analysis	1 2.1 2.3	Project Final	Reading: Banks – Chapter 12 Kelton – Chapter 6 Altiok – Chapter 9
14	Presentation	4		
15	Review			
Final exam				

Laboratory

Week	Content	CLOs	Assessment	Resources
1a	Introduction Introduction to Arena (Arena Window) Example: A Simple Process System <ul style="list-style-type: none"> • Flowchart Module: Create, Process, Dispose • Data Module: Entity, Resource, Queue; • Viewing report 	2.2	HW Midterm	-Reading: Kelton – Chapter 3 (Model 3-1)
1b	Modeling Production Lines Example: An Electronic Assembly & Test System <ul style="list-style-type: none"> • Flowchart Module: Assign, Decide, Record • Data Module: Variables, Attributes, Expression, Schedule, Failure, Statistics • Viewing Report 	2.2 3	HW Midterm	- Reading:Kelton – Chapter 3 (Model 4-1, 4-2)
2	Modeling Production Line (cont) Example: Other types of production lines: packaging, batch processing, assembly	2.2 3	HW Midterm Quiz	-Reading:Altiok – Chapter 11

	-Flowchart Module: Hold, Batch, Separate, Match			
3	Modeling Service system Example: A call center	2.2 3	HW Midterm	- Reading: Kelton – Chapter 5 (Model 5-1)
4	Modeling Service system (cont) Example: A call center	2.2 3	HW Midterm Quiz	- Reading: Kelton – Chapter 5 (Model 5-2)
Midterm exam				
5	Modeling Supply Chain System Example: An Inventory System	2.2 3	HW Final	-Reading: Altiok – Chapter 12.1
6	Modeling Transportation System Example: A Small Manufacturing System <ul style="list-style-type: none"> • Flowchart Module: Station, Route, • Data Module: Sequence 	2.2 3	HW Final Quiz	-Reading: Kelton – Chapter 7 (Model 7.1)
7	Modeling Transportation System Example: A small Manufacturing System with Entity Transfer	2.2 3	HW Final	-Reading: Kelton – Chapter 8 (Model 8.1)
8	Other techniques in Arena <ul style="list-style-type: none"> • Input data • DOE • Optimization 	2.2 3	HW Final Quiz	-Reading: Kelton – Chapter 10, 6
Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Project (10%)	x	x	x	x
Homework (20%) Quiz (10%)		x	x	
Midterm exam (30%) - Theory (18%) - Lab (12%)	x	x	x	
Final exam -Theory (18%) - Lab (12%)	x	x	x	

Note: %Pass: Target 70% of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)			
	10		
TOTAL SCORE			
	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: April 2022

Ho Chi Minh City, 04/2022

**Dean of School of Industrial Engineering
and Management**

(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: SCHEDULING & SEQUENCING

Course Code: **IS027IU**

1. General information

<i>Course designation</i>	<i>This course gives an introduction to scheduling problems: techniques, principles, algorithms and computerized scheduling systems. Topics include scheduling algorithms for single machine, parallel machine, flow shop, job shop and also solution methodologies such as heuristic procedures, constructive algorithms, branch and bound approaches, and genetic algorithms.</i>
<i>Semester(s) in which the course is taught</i>	2
<i>Person responsible for the course</i>	Dr. Phan Nguyen Ky Phuc
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson, project
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 Private study including examination preparation, specified in hours ³⁹ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	

³⁹ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	The course aims to equip students with the knowledge, skills, and techniques required to tackle scheduling problems across various industries and domains. It prepares them to apply scheduling algorithms and methodologies in practice, contribute to the development of scheduling systems, and make informed decisions to optimize scheduling processes.																																				
<i>Course learning outcomes</i>	<p>Upon the successful completion of this course students will be able to:</p> <table border="1"> <thead> <tr> <th>Competency level</th> <th>Course learning outcome (CLO)</th> </tr> </thead> <tbody> <tr> <td>Knowledge</td> <td> <p>CLO1 Students are able to master the basic knowledge of modeling different shop configurations, manufacturing scheduling problems, and performance measures.</p> <p>CLO2. Students are able to master the basic knowledge of identifying basic algorithms and procedures to use in different shop configurations.</p> <p>CLO3. Students are able to use different methods to solve engineering tasks by selecting different available methodologies in manufacturing and service scheduling problems.</p> </td> </tr> <tr> <td>Skill</td> <td>CLO4 Students are able to apply their knowledge and develop practical skills for solving problems, by using LINGO, CPLEX, Python software</td> </tr> </tbody> </table>	Competency level	Course learning outcome (CLO)	Knowledge	<p>CLO1 Students are able to master the basic knowledge of modeling different shop configurations, manufacturing scheduling problems, and performance measures.</p> <p>CLO2. Students are able to master the basic knowledge of identifying basic algorithms and procedures to use in different shop configurations.</p> <p>CLO3. Students are able to use different methods to solve engineering tasks by selecting different available methodologies in manufacturing and service scheduling problems.</p>	Skill	CLO4 Students are able to apply their knowledge and develop practical skills for solving problems, by using LINGO, CPLEX, Python software																														
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<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
<i>Reading list</i>	Textbooks: [1] M. L. Pinedo, Scheduling: Theory, Algorithms, and Systems, 3rd edition, Springer, 2008. References:

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	X						
2	X						
3						X	
4						X	

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

- an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
- an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
- an ability to communicate effectively with a range of audiences*
- an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
- an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
- an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-4) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
2		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
3		1.2a	1.3d		2.2b		2.4b	2.5a	

4		1.2a	1.3d		2.2b		2.4b	2.5a	
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3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Scheduling	1		Lecture	
2 & 3	How to build constraints	2,3	HW1	Lecture Think pair-share HW	
4&5	CPLEX software	4	Quiz1	Lecture Quiz	
6	PERT model	2,3	HW2	Lecture HW	
7&8	Single Machine Dispatching Rule Model	2,3	HW3	Lecture HW	
9	Midterm				
10	Scheduling with Workforce Constrain	2,3		Lab	
11	Job shop scheduling- Exact Math Model	2,3	Quiz2	Lecture Quiz	
12	Job shop scheduling- Shifting Bottle Neck	2,3		Lecture HW	
13&14	Scheduling of Flexible Assembly Systems	2,3	HW4	Lecture HW Group Project	
15	Scheduling in Flexible Flowshop and Jobshop	2,3	Quiz3	- Lecture Quiz	
16	Workforce Scheduling	2,3			
17	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class exercises/quizzes (10%)	Qz1 60% Pass		Qz3 60% Pass%Pass
Howework exercises (20%)	HW1 50% Pass	HW2 50% Pass	HW3 50% Pass	HW4 50%Pass
Midterm (30%)		60% Pass		
Final (40%)			60% Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Part 1..... (....%)			
Criterion 1:			
Criterion 2:			
Criterion 3:			
Criterion:			
Part 2..... (....%)			
Criterion 1 ...:			
Criterion ...:			
Part 3..... (....%)			
Criterion 1...:			
Criterion ...:			
Part (....%)			
	TOTAL SCORE	100	

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised:

Ho Chi Minh City, 2022

**Dean of School of Industrial Engineering
and Management**

(Signature)

Dr. Nguyen Van Hop



**VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY**
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: Lean Production

Course Code: **IS041IU**

1. General information

<i>Course designation</i>	This course will help students to understand the concepts and philosophies of lean, get familiar with lean tools/techniques, especially the concepts behind the tools/techniques used, and develop analytical, problem solving skills. Therefore, the students will be able to join well in most of foreign-invested enterprises or large organizations in Vietnam after graduation. Ultimately, they will be able to apply lean philosophy creatively in each unique practical situation.
<i>Semester(s) in which the course is taught</i>	7
<i>Person responsible for the course</i>	Dr. Tran Duc Vi
<i>Language</i>	English
<i>Relation to curriculum</i>	Specialization
<i>Teaching methods</i>	Lecture, project
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (lecture): 37.5 Private study including examination preparation, specified in hours ⁴⁰ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None
<i>Course objectives</i>	<ol style="list-style-type: none">1. Understand different kinds of production and the background and philosophies of lean production, analyzing existing systems and identify different kinds of waste2. Apply approaches used in implementing lean production such as 5S, stability, pull production, cellular arrangement and layout improvement, quick change, total productive maintenance, mistake reduction, standards, leveling, visual management to real-life problems

⁴⁰ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:		
	Competency level	Course learning outcome (CLO)	
	Knowledge	CLO1. Understand different kinds of production and the background and philosophies of lean production. Understand method to analyze existing systems and identify different kinds of waste.	
	Skills	CLO2. Apply approaches used in implementing lean production such as 5S, stability, pull production, cellular arrangement and layout improvement, quick change. Apply for total productive maintenance, mistake reduction, standards, leveling, visual management to real-life problems.	
<i>Content</i>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (3 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p>		
<i>Examination forms</i>	Writing, project presentation		
<i>Study and examination requirements</i>	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>		

<i>Reading list</i>	<p>Textbook:</p> <p>[1] Toyota Production System: An Integrated Approach to Just-In-Time, 4th Edition, Yasuhiro Monden.</p> <p>Other references:</p> <p>[2] Lean thinking: Banish waste and create wealth in your corporation, James Womack & Daniel Johns, Free Press, 2003</p> <p>[3] The Toyota way, Jeffrey Liker, McGraw-Hill, 2004</p> <p>[4] The machine that changed the world, James Womack, Daniel Johns and Daniel Roos, Rawson Associates, 1990</p> <p>[5] Lean production simplified, Pascal Dennis</p> <p>[6] Seeing the whole, Dan John, Jim Womark</p> <p>[7] Learning to see, Dan John, Jim Womark</p> <p>[8] Total Productive Maintenance, Steven Borris, McGraw-Hill, 2006</p>
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2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-2) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x	x				x	
2			x	x	x	x	x

Intended Learning Outcomes (*ABET_Student Outcomes*)

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a 2.2b		2.4a 2.4b	2.5a	
2	1.1a 1.1b 1.1c	1.2a	1.3a 1.3b 1.3c 1.3d		2.2b	2.3a	2.4b 2.4c	2.5a 2.5b	2.6a 2.6b

3. Planned learning activities and teaching methods

Week	Content	CLOs	Assessment	Learning Activities	Resources
1	The birth of Lean production, house of Lean production, Muda	1.1	HW	Lecture Project group forming Class Discussion Read Book	
2	Value stream mapping	1.1	HW, Midterm	Lecture Class Discussion Read Book	
3	Process stability – 5S, Toyota Productive Maintenance	1.1	HW, Midterm	Lecture Class Discussion Read Book	
4	Standardized work – takt time/ cycle time, work sequence, in- process stock Auditing standardized work	1.1	HW, Midterm	Lecture Class Discussion Read Book	
5	Production smoothing	1.1	HW, Midterm	Lecture Class Discussion Read Book	
6	Cellular manufacturing	2.1	HW, Midterm	Lecture Class Discussion Read Book	
7	Adaptable Kanban system maintains JIT production	2.1	HW, Midterm	Lecture Class Discussion Read Book	
8	Review for Midterm		Quiz	Class Discussion Problem solving	
9	Midterm Exam				
10	Determining the number of Kanban	1.2, 2.1	HW, Final	Lecture Class Discussion Read Book	
11	How Toyota shortened production lead time	1.2, 2.1	HW, Final	Lecture Class Discussion Read Book	
12	Autonomous defects control (Pokayoke)	1.2, 2.1	HW, Final	Lecture Class Discussion Read Book	
13	Numerical analysis for productivity improvement	1.2, 2.1	HW, Final	Lecture Class Discussion Read Book	
14	Implementing the TPS	1.2, 2.1	HW, Final	Lecture Class Discussion Read Book	
15	Presentation	2.1, 2.2, 3	Project	Presentation Class Discussion	
16	Review for Final				
17	Final Examination				

4. Assessment plan

Assessment Type	CLO1	CLO2
Project (15%)	x	x
Homework, quiz (15%)		x
Midterm exam (30%)	x	x

Final exam (40%)	x	x
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Note: %Pass: Target 70% of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)			
	10		
TOTAL SCORE			
	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: June 2022

Ho Chi Minh City, 06/2022
Dean of School of Industrial Engineering
and Management

(Signature)



Dr Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: ENGINEERING DRAWING

Course Code: **IS054IU**

1. General information

<i>Course designation</i>	<i>This subject will provide</i> students skills to present and interpret spatial models on planar models, present engineering drawings according to international standards (ISO). Methods of presenting models: orthogonal projection, isometric projection, ... Apply the projections to present objects in the drawings.
<i>Semester(s) in which the course is taught</i>	2
<i>Person responsible for the course</i>	Nguyen Van Chung
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, Exercises, Assignment.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 Private study including examination preparation, specified in hours ⁴¹ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None
<i>Course objectives</i>	Students will be provided with knowledge and skills of Analyzing, interpreting, and presenting engineering drawings. Applying appropriate drawing techniques for a practical application. Problem resolution on drawings. Systematically analyze the problem and apply the appropriate technique to solve the problem

⁴¹ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO1. Students will be able to Analyze, interpreting, and presenting engineering drawings.
	Skill	CLO2. Students will be able to Apply appropriate drawing techniques for a practical application. Problem resolution on drawings
Attitude	CLO3. Students will have integrative knowledge for Systematically analyze the problem and apply the appropriate technique to solve the problem.	

<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>			
	Weight: lecture and practice session			
	Teaching levels: I (Introduce); T (Teach); U (Utilize)			
	Topic	Content	Weight (hour)	Level
	Introduction to Engineering drawing (ED)	Introduction to ED, Standardization Chapter 1 (K Venkata Reddy) Chapter 1 (M.B. Shah,B.C. Rana)	1	I, T
	Drawing Instruments	Drawing Instrument, Drawing standards. Chapter 1 (K Venkata Reddy) Chapter 1 (M.B. Shah,B.C. Rana)	1	I, T, U
	Lettering and Dimensioning	Drawing sheet layout, Lines, Lettering, Dimensioning Chapter 2 (K Venkata Reddy) Chapter 1 (M.B. Shah,B.C. Rana)	3	I, T, U
	Geometrical Constructions	Geometrical constructions Chapter 4 (K Venkata Reddy) Chapter2 (K. Morling) Chapter 2 (M.B. Shah,B.C. Rana)	2	T, U
	Orthographic Projection	Types of Projections, Projection of an Object, first/third angle Projection. Views of Surfaces Chapter 5, 9 (K Venkata Reddy) Chapter 3, 6, 10 (K. Morling) Chapter 3, 4, 5, 10 (M.B. Shah,B.C. Rana)	5	T, U
	Midterm Exam			
	Sections and Sectional Views	Types of sections, Sectional orthographic projections, Sectioning rule for machine elements Chapter 11, 12 (K Venkata Reddy) Chapter 7, 11 (M.B. Shah,B.C. Rana)	7	T, U
	Part section	Representation of part section Chapter 18 (K. Morling)	1	I, T
	Assembly drawing	Views used in Assembly drawings, section lines in Assemblies	2	I, T
Final Exam				
<i>Examination forms</i>	Presenting engineering drawings			
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 70 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.			

<i>Reading list</i>	[1] K Venkata Reddy, <i>Textbook of Engineering Drawing</i> , BSP, 2008.
	[2] K. Morling, <i>Geometric and Engineering Drawing</i> , British Library, 2003.
	[3] M.B. Shah, B.C. Rana, <i>Engineering drawing</i> , Dorling Kindersley, 2007.
	[4] Basant Agrawal, Tata, <i>Engineering Drawing</i> , McGraw-Hill Education, 2008.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2		x					
3				x		x	

Intended Learning Outcomes (ILO)

Criteria for Accrediting Engineering Programs, 2020-2021

- an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
- an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
- an ability to communicate effectively with a range of audiences*
- an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
- an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
- an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a,1 .2b	1.3d	2.1a,2 .1b	2.2a				
2		1.2b	1.3c	2.1a,2 .1b			2.4a	2.5a	
3	1.1b	1.2a	1.3c,1 .3d		2.2b		2.4b	2.5a,2 .5b	2.6b

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Engineering drawing	CLO 1		Lecture presentation, in-class discussion	Reading [1] , [3]
2	Drawing Instruments	CLO 1	Exercises	Lecture presentation, in-class discussion	Reading [1] , [3]

3	Lettering and Dimensioning	CLO 1,2	Exercises	Lecture presentation, in-class discussion	Reading [1] , [3]
4	Geometrical Constructions	CLO 2, 3	Exercises	Lecture presentation, in-class discussion	Reading [1] , [2], [3]
5-6-7	Orthographic Projection	CLO 2, 3	Exercises, HW	Lecture presentation, in-class discussion	Reading [1] , [2], [3]
8-9	Midterm				
10-11-12-13	Sections and Sectional Views	CLO 3	Exercises, HW	Lecture presentation, in-class discussion	Reading [1] , [3]
14-15	Part section	CLO 3	Quiz	Lecture presentation, in-class discussion	Reading [2]
16	Assembly drawing	CLO 3	Quiz	Lecture presentation, in-class discussion	
17	Revision			in-class discussion	
18	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
In-class Exercises (10%)	Exercises 60% Pass	Exercises 60% Pass	
Homework, Exercises (20%)	Homework, Exercises 60% Pass	Homework, Exercises 60% Pass	Homework, Exercises 60% Pass
Midterm exam (30%)	60% Pass	60% Pass	
Final exam (40%)		60% Pass	60% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (70%)			
Show the correct dimensions and letters	15		
Correctly represent the lines of Engineering drawings	20		
Correctly and fully present the requirements of the views on drawings	35		

Organization (10%)			
Content clearly and logically organized	5		
Content clearly and logically organized, good transitions	5		
Presentation (15%)			
Layout of the views on drawings	15		
Clear and easy to read	5		
Quality of Layout and Graphics (5%)	5		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.
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Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is not appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: April 13th, 2022

	<p>Ho Chi Minh City, 13/04/2022</p> <p>Dean of School of Industrial Engineering and Management</p> <p>(Signature)</p>  <p>Dr. Nguyen Van Hop</p>
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VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: Numerical Methods

Course Code: **IS089IU**

1. General information

<i>Course designation</i>	Students learn numerical methods: Error analysis, matrices, system of linear equations, approximation theory, numerical solution of nonlinear systems of equations, interpolation, numerical differentiation and integration, numerical solution of differential equations,
<i>Semester(s) in which the course is taught</i>	5
<i>Person responsible for the course</i>	Dr. Dao Vu Truong Son
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, Exercises, Assignment.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 Private study including examination preparation, specified in hours ⁴² : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Nil
<i>Course objectives</i>	Error analysis, matrices, system of linear equations, approximation theory, numerical solution of nonlinear systems of equations, interpolation, numerical differentiation and integration, numerical solution of differential equations, finding sum of series, introduction to random number generation and simulation, introduction to linear programming. Programming and application projects will be emphasized.

⁴² When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:		
	Competency level	Course learning outcome (CLO)	
	Knowledge	CLO1. Understand modern approximation techniques CLO2. Understand different numerical methods.	
	Skill	CLO3. Use engineering software to program solutions for numerical method problems	
Attitude	CLO4. Students will have positive attitude in both self-learning and group discussion with other disciplines related to engineering problems using numerical methods.		
<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (3 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Numerical Representation and Errors	3	I, T
	Solutions of Equations in One Variable: Bisection Method, Newton-Raphson Method, Secant Method	3	I, T
	System of Linear Equations	6	I, T
	Theory of Approximation: least squares:	3	I, T
	Numerical Solution of Nonlinear systems of Equations	3	I, T
	Interpolation: polynomial interpolation, errors in polynomial interpolation.	3	T, U
	Approximation by spline functions: cubic spline interpolation, B spline, Hermite interpolation	3	I, T
Numerical differentiation and integration	3	I, T	
System of ordinary differential equations:	3	I, T	
<i>Examination forms</i>	Practice, Writing questions		
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
<i>Reading list</i>	[1] [Cheney W., and Kincaid D., (1994). Numerical Mathematics and Computing. 3rd Edition, Brooks/Cole Publishing Company, California. [2] Burden R.L., and Faires J.D., (1993). Numerical Analysis. 5th Edition, PWS Publishing Company, Boston		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-6) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2		x					

3			x	x			
4					x	x	

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-4) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
2		1.2b	1.3c	2.1a 2.1b			2.4a	2.5a	
3	1.1b 1.1c		1.3a 1.3c					2.5b	2.6a 2.6b
4	1.1c	1.2a	1.3b 1.3d		2.2b		2.4b	2.a	2.6a

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction, Programming suggestion Numerical Representation and Errors: Representation of numbers in different bases, floating point representation, loss of significance	1	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass- Quiz	[1].1
2	Solutions of Equations in One Variable: Bisection Method, Newton-Raphson Method, Secant Method	1, 2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass- Quiz	[1].2
3,4,5	System of Linear Equations:	2,3	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass- Quiz	[1] 3
6	Theory of Approximation: least squares: linear least square fitting, orthogonal systems and Chebyshev polynomials.	1, 2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass- Quiz	[1].4

7	Numerical Solution of Nonlinear systems of Equations: Newton's Method, Quasi-newton methods, steepest Descent techniques	1, 2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].5
8	Review		Exercises		
9	Midterm				
10	Interpolation: polynomial interpolation, errors in polynomial interpolation.	1, 2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].6
11	Approximation by spline functions: cubic spline interpolation, B spline, Hermite interpolation	1, 2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].7
12,13	Numerical differentiation and integration: differentiation	1, 2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].8
14	Interpolation: polynomial interpolation, errors in polynomial interpolation.	1, 2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].9
15	System of ordinary differential equations	1, 2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].10
16	Project presentation	3,4	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].11
17	Review				
18	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class assignment +Project (30%)	50% Pass	50% Pass	50% Pass	50% Pass
Midterm exam (30%)	60% Pass	60% Pass		
Final exam (40%)		60% Pass	60% Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (65%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	35		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (5%)			
TOTAL SCORE			
	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: April 15, 2022

Ho Chi Minh City, 15/04/2022

**Dean of School of Industrial Engineering
and Management**

(Signature)



Dr. Nguyen Van Hop



**VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY**
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: MULTI-CRITERIA DECISION MAKING

Course Code: IS033IU

1. General information

<i>Course designation</i>	This course provides basic concepts, tools and techniques of decision making for solving complex problems in production, services, and daily life. This course includes two parts: multi-attribute decision making (MADM) and multi-objective decision making (MODM).
<i>Semester(s) in which the course is taught</i>	1
<i>Person responsible for the course</i>	Dr. Ha Thi Xuan Chi
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson, project
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 Private study including examination preparation, specified in hours ⁴³ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	

⁴³ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	Decision making is one of the important parts in operations research or management science. Decision making techniques help managers choose the best alternative based on quantitative and qualitative criteria or find the optimal solutions under many conflicts of objectives. Output analysis is also considered to draw inference of the actual problems. This course provides basic concepts, tools and techniques of decision making for solving complex problems in production, services, and daily life. This course includes two parts: multi-attribute decision making (MADM) and multi-objective decision making (MODM).																														
<i>Course learning outcomes</i>	<p>Upon the successful completion of this course students will be able to:</p> <table border="1"> <thead> <tr> <th>Competency level</th> <th>Course learning outcome (CLO)</th> </tr> </thead> <tbody> <tr> <td>Knowledge</td> <td> CLO1. Able to build the procedure for decision making CLO2. Able to recognize MADM and MODM techniques CLO3. Able to model problems by using MADM techniques CLO4. Able to apply knowledge of deterministic models in operation research to formulate MODM models CLO5. Able to solve MODM problems by using MODM techniques CLO6. Able to read and interpret the solutions CLO7. Able to redesign the models to meet the requirements </td> </tr> <tr> <td>Skill</td> <td>CLO8. Able to use Expert Choice software as a tool to solve AHP technique</td> </tr> <tr> <td>Attitude</td> <td></td> </tr> </tbody> </table>	Competency level	Course learning outcome (CLO)	Knowledge	CLO1. Able to build the procedure for decision making CLO2. Able to recognize MADM and MODM techniques CLO3. Able to model problems by using MADM techniques CLO4. Able to apply knowledge of deterministic models in operation research to formulate MODM models CLO5. Able to solve MODM problems by using MODM techniques CLO6. Able to read and interpret the solutions CLO7. Able to redesign the models to meet the requirements	Skill	CLO8. Able to use Expert Choice software as a tool to solve AHP technique	Attitude																							
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<i>Content</i>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (3 hours) Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Introduction to MCDM</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Introduction to Multi-Attribute Decision Making Techniques: Simple Addictive Weight Technique, TOPSIS</td> <td>2</td> <td>T, U</td> </tr> <tr> <td>Analytic Hierarchy Process</td> <td>1</td> <td>T, U</td> </tr> <tr> <td>Introduce to Expert choice software to solve Analytic Hierarchy Process problems</td> <td>2</td> <td>T, U</td> </tr> <tr> <td>Fuzzy AHP</td> <td>2</td> <td>T, U</td> </tr> <tr> <td>Introduction to Multi-Objective Decision Making</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Minimum Deviation and Compromise Programming</td> <td>1</td> <td>T, U</td> </tr> <tr> <td>Goal Programming</td> <td>0.5</td> <td>T, U</td> </tr> <tr> <td>De Novo Technique</td> <td>0.5</td> <td>T, U</td> </tr> </tbody> </table>	Topic	Weight	Level	Introduction to MCDM	1	I, T	Introduction to Multi-Attribute Decision Making Techniques: Simple Addictive Weight Technique, TOPSIS	2	T, U	Analytic Hierarchy Process	1	T, U	Introduce to Expert choice software to solve Analytic Hierarchy Process problems	2	T, U	Fuzzy AHP	2	T, U	Introduction to Multi-Objective Decision Making	2	I, T	Minimum Deviation and Compromise Programming	1	T, U	Goal Programming	0.5	T, U	De Novo Technique	0.5	T, U
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<i>Examination forms</i>	Written Exam
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
<i>Reading list</i>	Textbooks: [1] “Multiple Attribute Decision Making: Methods and applications”. Gwo-Hshiang Tzeng & Jih-Jeng Huang, CRC Press, Taylor & Francis Group, 2011 by Taylor & Francis Group. References: [2] Milan Zeleny, Multiple Criteria Decision Making, McGraw-Hill, 1982. Software: Expert choice

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-...) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2	x						
3	x	x					
4	x	x					
5	x	x					
6	x	x					
7						x	
8						x	

Intended Learning Outcomes

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

ASIIN learning outcomes									
CLO	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
2		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
3		1.2a 1.2b	1.3d 1.3c	2.1a, 2.1b	2.2a		2.4a	2.5a	
4		1.2a 1.2b	1.3d 1.3c	2.1a, 2.1b	2.2a		2.4a	2.5a	
5		1.2a 1.2b	1.3c 1.3d	2.1a 2.1b	2.2a		2.4a	2.5a	
6		1.2a 1.2b	1.3c 1.3d	2.1a 2.1b	2.2a		2.4a	2.5a	
7		1.2a	1.3d		2.2b		2.4b	2.5a	
8		1.2a	1.3d		2.2b		2.4b	2.5a	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
	Introduction to MCDM	1, 2		Lecture	
	Introduction to Multi-Attribute Decision Making Techniques: Simple Addictive Weight Technique, TOPSIS	2, 6, 7	HW1	Lecture Think pair-share HW	
	Analytic Hierarchy Process	3, 6, 7	HW2	Lecture Think pair-share HW	
&5	Introduce to Expert choice software to solve Analytic Hierarchy Process problems	3, 6, 7	HW3, Exam	Lecture Think pair-share HW	
	Fuzzy AHP	2, 6, 7	HW4, Exam	Lecture, Class discussion and practice	
	ELECTRE technique	2, 6, 7	HW5, Exam	Lecture, Class discussion and practice	
	Review	2, 3, 6, 7	HW6, Exam	Lecture, Class discussion and practice	
	Midterm exam				
0	Introduction to Multi-Objective Decision Making	4	Quiz 1	Lecture, Class discussion, Quiz	
1	Minimum Deviation and Compromise Programming	4, 5, 6, 7	Semester Project	Lecture, Class discussion, Group Project	
2	Goal Programming	4, 5, 6, 7	HW7, Exam	Lecture, Class discussion HW	
3	De Novo Technique	4, 5, 6, 7	HW8, Exam	Lecture, Class discussion, HW	
4	Review			Lecture	
5	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6	CLO7	CLO8
Homework exercise /quizzes (15%)%Pass	HW1 60% Pass HW4, HW5 60% Pass	HW2 60% Pass HW3, HW6 60% Pass	Quiz 1 60% Pass HW7, HW8 60% Pass	HW7, HW8 60% Pass	HW1 60% Pass HW2, HW3, HW4, HW5 60% Pass HW7, HW8 60% Pass	HW1 60% Pass HW2, HW3, HW4, HW5 60% Pass HW7, HW8 60% Pass	
Group Project (15%)	60% Pass	60% Pass		Group Project 60% Pass	Group Project 60% Pass	Group Project 60% Pass	Group Project 60% Pass	
Midterm (30%)	60% Pass	60% Pass	60% Pass	60% Pass				
Final (40%)	60% Pass	60% Pass	60% Pass	60% Pass				

Note: %Pass: Target that 60% of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (80%)			
Problem Identification: Be able to identify the objective(s), alternative(s) and criteria in the Industrial Engineering and Management field.	20		
Data collection and software usage: Know how to transform the data into the proper form and solve the models using computer-based software such as Expert Choice, Excel,...	20		
Methodology: Know how to apply proper decision-making techniques to solve the problem.	20		
Solution and Implementations: Be able to implement the solution in practices and do the output analysis.	20		
Report writing and Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description

5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised:

Ho Chi Minh City, 2022

**Dean of School of Industrial Engineering
and Management**

(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SPECIFICATION

COURSE SYLLABUS

SYLLABUS OF SPECIALIZED KNOWLEDGE (ELECTIVE) COURSES



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: E-LOGISTICS IN SUPPLY CHAIN MANAGEMENT

Course Code: IS062IU

1. General information

<i>Course designation</i>	<i>This course introduces supply chain systems for e-commerce. Topics will cover all aspects of an e-supply chain system from different e-commerce models and e-supply chain structure, demand forecasting, e-procurement, customer segmentation and e-CRM, e-logistics system design, e-manufacturing. E-warehousing and e-fulfillment center, e-shipping and e-distribution system, and some OR applications in e-supply chain problems.</i>
<i>Semester(s) in which the course is taught</i>	1
<i>Person responsible for the course</i>	Assoc. Prof. Nguyen Van Hop
<i>Language</i>	English
<i>Relation to curriculum</i>	Elective
<i>Teaching methods</i>	Lecture, lesson, project
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload:137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 lecture hours Private study including examination preparation, specified in hours ⁴⁴ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	

⁴⁴ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	<p>This course aims to provide for students:</p> <ul style="list-style-type: none"> • To understand the components of an e-supply chain system and how to efficiently manage, coordinate, improve, or design/re-design the whole e-supply chain system or its components; • To discuss practical issues in e-supply chain management as well as the solutions for such issues; • To develop skill in applying a variety of techniques to solve e-logistics/supply chain problems. 	
<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO1. Understanding the e-business models and the components of an e-supply chain system to support running smoothly these business processes. Comparing the differences between the traditional supply chain and the e-supply chain.
	Skill	CLO2. Identify various issues in e-supply chain systems. Apply different optimization and advanced advanced knowledge of natural sciences, mathematics and engineering to solve complex problems arisen in e-Business processes by collecting input data, analyzing parameters, doing literature review, conducting detailed research and experiments, and interpretation of data and solutions.
Attitude	CLO3. Develop teamworking (leadership, organize, plan, and manage the projects), soft and professional (communication, decision making) skills and apply ethical practices to handle issues in the working environment.	

<p><i>Content</i></p>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (3 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Lecture 1: Introduction to supply chain management in e-Business</td> <td>1</td> <td>I, T, U</td> </tr> <tr> <td>Lecture 2: e-Business models</td> <td>1</td> <td>I, T, U</td> </tr> <tr> <td>Lecture 3: Forecasting demand with big data</td> <td>1</td> <td>I, T, U</td> </tr> <tr> <td>Lecture 4: e-Procurement</td> <td>1</td> <td>I, T, U</td> </tr> <tr> <td>Lecture 5: e-CRM</td> <td>2</td> <td>I, T, U</td> </tr> <tr> <td>Lecture 6: Manufacturing in the age of e-Business</td> <td>1</td> <td>I, T, U</td> </tr> <tr> <td>Lecture 7: e-Logistics</td> <td>2</td> <td>I, T, U</td> </tr> <tr> <td>Lecture 8: e-Warehousing and e-fulfillment center</td> <td>2</td> <td>I, T, U</td> </tr> <tr> <td>Lecture 9: e-Distribution and e-shipping</td> <td>2</td> <td>I, T, U</td> </tr> <tr> <td>Lecture 10: OR applications in e-supply chain</td> <td>1</td> <td>I, T, U</td> </tr> </tbody> </table>	Topic	Weight	Level	Lecture 1: Introduction to supply chain management in e-Business	1	I, T, U	Lecture 2: e-Business models	1	I, T, U	Lecture 3: Forecasting demand with big data	1	I, T, U	Lecture 4: e-Procurement	1	I, T, U	Lecture 5: e-CRM	2	I, T, U	Lecture 6: Manufacturing in the age of e-Business	1	I, T, U	Lecture 7: e-Logistics	2	I, T, U	Lecture 8: e-Warehousing and e-fulfillment center	2	I, T, U	Lecture 9: e-Distribution and e-shipping	2	I, T, U	Lecture 10: OR applications in e-supply chain	1	I, T, U
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<i>Reading list</i>	<p>Textbooks:</p> <ul style="list-style-type: none"> - Chaffey D. and Hemphill T., Digital business and E-Commerce management, Pearson, 2019. - Ross D. F., Introduction to E-Supply Chain Management: Engaging Technology to Build Market – Winning Business Partnerships, St.Lucie Press, 2003. (e-book, https://www.scribd.com/document/51582619/e-supply-chain-book) - Wang Y. and Pettit S., E-logistics: Managing your digital supply chains for competitive advantage, KoganPage, 2016. <p>References:</p> <ul style="list-style-type: none"> - Simchi-Levi D., Chen X., and Bramel J., The Logic of Logistics: Theory, Algorithms, and Applications for Logistics Management. Springer Series in Operations Research and Financial Engineering: 2014. - Deborah L. Bayles, <i>E-commerce Logistics and Fulfillment: Delivering the Goods</i>, Prentice Hall, 2001. - Graham, D., Manikas, I., and Folinias, D., <i>E-Logistics and E-Supply Chain Management: Applications for Evolving Business</i>, 1st edition, IGI Global, 2013. - Adam Robinson, <i>E-Commerce Logistics: Background & Considerations for Manufacturers & Distributors</i>, Cerasis, 2016, (e-book, http://cerasis.com/category/e-books/) - Janice Reynolds, <i>Logistics and Fulfillment for E-Business: A Practical Guide to Mastering Back Office Functions for Online Commerce</i>.CMP Books, 2001 - Dave Chaffey, <i>E-Business & E-Commerce Management: Strategy, implementation, and practice, 5th ed.</i> Harlow: Pearson Education Limited, 2011. - Janice Reynolds, <i>Logistics and Fulfillment for E-Business: A Practical Guide to Mastering Back Office Functions for Online Commerce</i>.CMP Books, 2001
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2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-...) and Intended Learning Outcomes (ILO) (1 -7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						x
2	x	x				x	
3			x	x	x		

Intended Learning Outcomes (ILO)

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the

following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1a, 1.1b, 1.1c	1.2a, 1.2b	1.3c, 1.3d	2.1a, 2.1b	2.2a	2.3a	2.4c		
2		1.2a, 1.2b	1.3c, 1.3d	2.1a, 2.1b	2.2a, 2.2b		2.4a, 2.4b	2.5a	
3	1.1b,1 .1c		1.3a, 1.3b, 1.3c				2.4b	2.5a, 2.5b	2.6a, 2.6b

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Lecture 1: Introduction to supply chain management in e-Business	1	Quiz/HW	Lecture Group forming. Class discussion Read book & lecture 2.	
2	Lecture 2: e-Business models	1	Quiz/HW	Lecture Class discussion Read book & lecture 3.	
3	Lecture 3: Forecasting demand with big data	1	Quiz/HW	Lecture Class discussion Read book & lecture 4.	
4 & 5	Lecture 4: e-Procurement	1	Quiz/HW	Lecture Class discussion Read book & lecture 5.	
6 & 7	Lecture 5: e-CRM	1, 2	Quiz/HW	Lecture Class discussion.	
	Midterm		Written Exam		
8	Lecture 6: Manufacturing in the age of e-Business	1, 2	Quiz/HW	Lecture Class discussion Read book & lecture 7.	
9 & 10	Lecture 7: e-Logistics	1, 2	Quiz/HW	Lecture Class discussion Read book & lecture8.	
11 & 12	Lecture 8: e-Warehousing and e-fulfillment center	1, 2	Quiz/HW	Lecture Class discussion Read book & lecture 9.	
13	Lecture 9: e-Distribution and e-shipment	1, 2	Quiz/HW	Lecture Class discussion Read book & lecture 10	
14	Lecture 10: OR applications in e-SCM	1,2	Quiz/HW	Lecture Class discussion	
15	Project report and presentation	2,3	Project	Group presentations Class discussion	
	Final exam		Written Exam		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
Quizzes and homework (15%)	60% Pass	60% Pass	100% Pass
Project (15%)	60% Pass	60% Pass	100% Pass

Midterm Exam (30%)	60% Pass	60% Pass	90% Pass
Final Exam (40%)	60% Pass	60% Pass	90% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Semester Project Report			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Part 1. Problem (25%)			
Criterion 1: Problem Statement	10		
Criterion 2: Objectives of Study	5		
Criterion 3: Scope and Limitations	5		
Criterion 4: Literature Review	5		
Part 2. Proposed System Design and Solution (40%)			
Criterion 1: Proposed System	10		
Criterion 2: Proposed Solution	15		
Criterion 3: New Contribution	15		
Part 3. Results and Validation (35%)			
Criterion 1: Results	15		
Criterion 2: Validation	20		
TOTAL SCORE		100	

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: 10/5/2022

Ho Chi Minh City, 10/05/2022

Dean of School of Industrial Engineering
and Management

(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: TIME SERIES AND FORECASTING TECHNIQUES

Course Code: **IS058IU**

1. General information

<i>Course designation</i>	It provides an overview of fundamental concepts: <ul style="list-style-type: none"> i. The formulation and specification of forecasting models; ii. data collection, interpretation, organization, and analysis for building forecasting models; iii. fundamental statistical and probability concepts used in forecasting; iv. the existence of a hierarchy of forecasting models;
<i>Semester(s) in which the course is taught</i>	1
<i>Person responsible for the course</i>	<i>Dr. Ha Thi Xuan Chi</i>
<i>Language</i>	English
<i>Relation to curriculum</i>	<i>Compulsory</i>
<i>Teaching methods</i>	<i>Lecture, lesson, project</i>
<i>Workload (incl. contact hours, self-study hours)</i>	<i>(Estimated) Total workload: 137.5</i> <i>Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5</i> <i>Private study including examination preparation, specified in hours⁴⁵: 100</i>
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Engineering Probability & Statistics Production and Operations Management

⁴⁵ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<p><i>Course objectives</i></p>	<p>The general objectives for this course are to</p> <ul style="list-style-type: none"> ▪ Provide students with an introduction to the importance and use of economic forecasting to reduce uncertainty; ▪ Provide students with an understanding of data analysis applicable to developing economic forecasts; ▪ Provide students with an understanding of forecasting error metrics; ▪ Provide students with the basics of economic forecasting methods and models; ▪ Expose students to the use of a computer package for developing forecasting models; ▪ Allow students to apply the techniques learned in the course to lab assignments; ▪ Make policy recommendations (private and public) based on rational forecasts. 								
<p><i>Course learning outcomes</i></p>	<p>Upon the successful completion of this course students will be able to:</p> <table border="1"> <thead> <tr> <th>Competency level</th> <th>Course learning outcome (CLO)</th> </tr> </thead> <tbody> <tr> <td>Knowledge</td> <td> CLO1. Students are able to use and identify different methods of forecast error measures, CLO2. Students are able to identify, discuss features of appropriate forecasting models, and choose the most suitable methods and correct implementation CLO3. Students have Engineering and Scientific knowledge to manipulate the mathematical and statistical properties of classes of forecasting models. </td> </tr> <tr> <td>Skill</td> <td> CLO4. Students are able to do literature review, drafting and conduction of experiments, interpretation of data, manipulate features of computer packages and computer simulations. </td> </tr> <tr> <td>Attitude</td> <td></td> </tr> </tbody> </table>	Competency level	Course learning outcome (CLO)	Knowledge	CLO1. Students are able to use and identify different methods of forecast error measures, CLO2. Students are able to identify, discuss features of appropriate forecasting models, and choose the most suitable methods and correct implementation CLO3. Students have Engineering and Scientific knowledge to manipulate the mathematical and statistical properties of classes of forecasting models.	Skill	CLO4. Students are able to do literature review, drafting and conduction of experiments, interpretation of data, manipulate features of computer packages and computer simulations.	Attitude	
Competency level	Course learning outcome (CLO)								
Knowledge	CLO1. Students are able to use and identify different methods of forecast error measures, CLO2. Students are able to identify, discuss features of appropriate forecasting models, and choose the most suitable methods and correct implementation CLO3. Students have Engineering and Scientific knowledge to manipulate the mathematical and statistical properties of classes of forecasting models.								
Skill	CLO4. Students are able to do literature review, drafting and conduction of experiments, interpretation of data, manipulate features of computer packages and computer simulations.								
Attitude									

<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>						
	Weight: lecture session (3 hours)						
	Teaching levels: I (Introduce); T (Teach); U (Utilize)						
	Topic	Weight	Level				
	Introduction to Forecasting	1	I, T				
	Review of Basic Statistical Concepts	2	T, U				
	Data Patterns and Forecasting Techniques	1	T, U				
	Moving Averages and Smoothing Methods	2	T, U				
	Time-Series and Their Components	2	T, U				
	Introduction to Forecasting	2	I, T				
	Review of Basic Statistical Concepts	1	T, U				
	Box-Jenkins (ARIMA) Type	0.5	T, U				
Forecasting Models		T, U					
Simple Linear Regression Multiple Regression Analysis/Time Series		T, U					
<i>Examination forms</i>	Written Exam						
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.						
<i>Reading list</i>	Textbooks: Introduction to Time Series and Forecasting, Montgomery et al., Publisher: J. Wiley & Sons						

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1 -7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2	x						
3	x						x
4						x	x

Intended Learning Outcomes

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-4) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
2		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
3	1.1a 1.1b 1.1c	1.2a 1.2b	1.3c 1.3d	2.1a 2.1b	2.2a	2.3a	2.4c		
4	1.1a 1.1b 1.1c	1.2a 1.2b	1.3c 1.3d	2.1a 2.1b	2.2a 2.2b	2.3a	2.4b 2.4c	2.5a	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Forecasting	2	Quiz 1	Lecture Class discussion Quiz	
2	Review of Basic Statistical Concepts	2	HW1	Lecture Class discussion HW	
3&4	Data Patterns and Forecasting Techniques	2	Quiz 2 HW2	Lecture Class discussion HW, Quiz	
5	Moving Averages and Smoothing Methods	1, 2	HW3	Lecture Class discussion HW	
6	Time-Series and Their Components	1, 2, 3	HW4,	Lecture Class discussion HW	
7	Review			Lecture Class discussion	
	Midterm exam				
8&9	Introduction to Multi-Objective Decision Making	1, 3	HW5, Group Project	Lecture, Class discussion, HW, Group Project	
10&11	Minimum Deviation and Compromise Programming	3, 4	Quiz 3, HW6	Lecture, Class discussion, Quiz, HW	
12&13	Goal Programming	3, 4	Quiz 4, HW7	Lecture, Class discussion, Quiz, HW	
14	Review			Lecture	
15	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Homework exercise /quizzes (15%)	HW3, HW4, HW5 60%Pass	HW1, HW2, HW4 60%Pass Quiz 1, Quiz 2 60%Pass	HW4, HW5 HW6, HW7 60%Pass Quiz 3, Quiz 4 60%Pass	HW4, HW6, HW7 60%Pass Quiz 3, Quiz 4 60%Pass
Group Project (15%)	Group Project 60%Pass		Group Project 60%Pass	
Midterm (30%)	60% Pass	60% Pass	60% Pass	
Final (40%)	60% Pass	60% Pass	60% Pass	60% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:		HW/Assignment:	
Date:		Evaluator:	
	Max.	Score	Comments
Part 1..... (...%)			
Criterion 1:			
Criterion 2:			
Criterion 3:			
Criterion ...:			
Part 2..... (...%)			
Criterion 1 ...:			
Criterion ...:			
Part 3..... (...%)			
Criterion 1...:			
Criterion ...:			
Part (...%)			
TOTAL SCORE		100	

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone	Benchmark
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	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised:

Ho Chi Minh City, 2022
Dean of School of Industrial
Engineering and Management

(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: SYSTEMS ENGINEERING

Course Code: **IS035IU**

1. General information

<i>Course designation</i>	Systems Engineering is the course of methods to developing and analyzing the systems. This course provides the knowledge and skills necessary for the engineers in the development process and systems analysis
<i>Semester(s) in which the course is taught</i>	5
<i>Person responsible for the course</i>	Dr. Dao Vu Truong Son
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, Exercises, Assignment.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 Private study including examination preparation, specified in hours ⁴⁶ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Nil
<i>Course objectives</i>	Systems Engineering is the course of methods to developing and analyzing the systems. This course provides the knowledge and skills necessary for the engineers in the development process and systems analysis (manufacturing and services): systems engineering processes, methods of evaluation, selection and integration of system components, system simulation, and assessment of reliability, availability, and serviceability of the systems.

⁴⁶ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:		
	Competency level	Course learning outcome (CLO)	
	Knowledge	CLO1. Understand the fundamentals and concepts of systems engineering and analysis. Analyze and evaluate existing systems CLO2. Understand and select the necessary components of a system.	
	Skill	CLO3. Use engineering methodology to develop or improve a system	
Attitude	CLO4. Students will have positive attitude in both self-learning and group discussion with other disciplines related to engineering mechanic related problems.		
<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (3 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Introduction to Systems Engineering	3	I, T
	Conceptual System Design	3	I, T
	Preliminary System Design	3	I, T
	Detail Design and Development	3	I, T
	System Test, Evaluation, and Validation.	3	I, T
	Alternatives and Models in Decision Making	3	T, U
	Models for Economic Evaluation	3	I, T
	Control Concepts and Methods	6	I, T
	Design for Reliability	6	I, T
Design for Maintainability	3	I, T	
Design for Producibility, Disposability, and Sustainability	3	I, T	
<i>Examination forms</i>	Practice, Writing questions		
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
<i>Reading list</i>	Blanchard B.S., Systems Engineering and Analysis (5ed.), Prentice Hall, 2010.		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-6) is shown in the following table:

	ILO						
CLO	1	2	3	4	5	6	7

1	x						
2		x					
3			x	x			
4					x	x	

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-4) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
2		1.2b	1.3c	2.1a 2.1b			2.4a	2.5a	
3	1.1b 1.1c		1.3a 1.3c					2.5b	2.6a 2.6b
4	1.1c	1.2a	1.3b 1.3d		2.2b		2.4b	2.a	2.6a

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Systems Engineering	1,2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].1
2	Conceptual System Design	1, 2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].2
3	Preliminary System Design	1,2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1] 3
4	Detail Design and Development	1,2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1] 4

5	System Test, Evaluation, and Validation.	1,2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1] 5
6,7	Alternatives and Models in Decision Making	1,2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1] 6
8	Review		Exercises		
9	Midterm				
10	Models for Economic Evaluation	1,2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1] 7
11	Control Concepts and Methods	1,2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1] 8
12	Design for Reliability	1,2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].9
13	Design for Maintainability	1,2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].10
14	Design for Producibility, Disposability, and Sustainability (optional)	1,2	Exercises, HW, Quiz	Lecture, Discussion, HW Inclass-Quiz	[1].11
15	Project presentation	3,4			
16	Review				
17	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Project (30%)			50% Pass	50% Pass
Midterm exam (30%)	60% Pass	60% Pass		
Final exam (40%)		60% Pass	60% Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports	
Student:	HW/Assignment:

Date:		Evaluator:		
	Max.	Score	Comments	
Technical content (65%)				
Abstract clearly identifies purpose and summarizes principal content	10			
Introduction demonstrates thorough knowledge of relevant background and prior work	15			
Analysis and discussion demonstrate good subject mastery	35			
Summary and conclusions appropriate and complete	5			
Organization (10%)				
Distinct introduction, body, conclusions	5			
Content clearly and logically organized, good transitions	5			
Presentation (20%)				
Correct spelling, grammar, and syntax	10			
Clear and easy to read	10			
Quality of Layout and Graphics (5%)				
	05			
TOTAL SCORE		100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: April 15, 2022

Ho Chi Minh City, 14/04/2022

**Dean of School of Industrial Engineering
and Management**

(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: Leadership

Course Code: **IS045IU**

1. General information

<i>Course designation</i>	While typical leadership classes leave learners knowing about leadership and other leaders, the course is designed to give students actual access to being a leader and the effective exercise of leadership as their natural self-expression. This is achieved by exploring how listening, speech acts, and language are instrumental to being a leader; identifying blind spots; practicing new ways of being; accepting breakdowns; celebrating breakthroughs; keeping an open mind, rejecting preconceived notions, and being authentic. Topics include authentic listening, integrity, authenticity. Furthermore, students will discover how human brain's neural functioning, listening, and language fundamentally construct what we can perceive and accomplish as leaders in our relationships, organizations, families, and societies.
<i>Semester(s) in which the course is taught</i>	7
<i>Person responsible for the course</i>	Dr. Tran Duc Vi
<i>Language</i>	English
<i>Relation to curriculum</i>	Elective BA
<i>Teaching methods</i>	Lecture, project
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (lecture): 37.5 Private study including examination preparation, specified in hours ⁴⁷ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None

⁴⁷ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	<ol style="list-style-type: none"> 1. Understand the role of leadership and management. Know important leadership traits and styles. 2. Understand different factors affecting the decision-making process and leadership effectiveness. Apply leadership models in practice. 3. Communicate ideas coherently and effectively. 																																				
<i>Course learning outcomes</i>	<p>Upon the successful completion of this course students will be able to:</p> <table border="1"> <thead> <tr> <th>Competency level</th> <th>Course learning outcome (CLO)</th> </tr> </thead> <tbody> <tr> <td>Knowledge</td> <td> CLO1 Understand the role of leadership and management and importance of leadership traits, styles. CLO2 Understand different factors affecting the decision-making process and leadership effectiveness. </td> </tr> <tr> <td>Skills</td> <td>CLO3 Apply leadership models in practice, communicate ideas coherently and effectively.</td> </tr> </tbody> </table>	Competency level	Course learning outcome (CLO)	Knowledge	CLO1 Understand the role of leadership and management and importance of leadership traits, styles. CLO2 Understand different factors affecting the decision-making process and leadership effectiveness.	Skills	CLO3 Apply leadership models in practice, communicate ideas coherently and effectively.																														
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<i>Content</i>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (3 hours) Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Introduction to Leadership</td> <td>1</td> <td>I</td> </tr> <tr> <td>Already Always Listening</td> <td>1</td> <td>I, T, U</td> </tr> <tr> <td>Trait Approach</td> <td>1</td> <td>I, T, U</td> </tr> <tr> <td>Authentic Leadership</td> <td>1</td> <td>I, T, U</td> </tr> <tr> <td>Integrity</td> <td>2</td> <td>I, T, U</td> </tr> <tr> <td>Skill Approach</td> <td>1</td> <td>I, T, U</td> </tr> <tr> <td>Foundation of Leadership</td> <td>1</td> <td>I, T, U</td> </tr> <tr> <td>Adaptive Leadership</td> <td>1</td> <td>I, T, U</td> </tr> <tr> <td>Behavior – Style Approach</td> <td>1</td> <td>I, T, U</td> </tr> <tr> <td>Situational Approach</td> <td>1</td> <td>I, T, U</td> </tr> <tr> <td>Power of Context</td> <td>1</td> <td>I, T, U</td> </tr> </tbody> </table>	Topic	Weight	Level	Introduction to Leadership	1	I	Already Always Listening	1	I, T, U	Trait Approach	1	I, T, U	Authentic Leadership	1	I, T, U	Integrity	2	I, T, U	Skill Approach	1	I, T, U	Foundation of Leadership	1	I, T, U	Adaptive Leadership	1	I, T, U	Behavior – Style Approach	1	I, T, U	Situational Approach	1	I, T, U	Power of Context	1	I, T, U
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<i>Examination forms</i>	Writing, project presentation																																				
<i>Study and examination requirements</i>	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>																																				

<i>Reading list</i>	<p>Textbook:</p> <p>[1] Northouse, P., 2018. Leadership: Theory and Practice. SAGE Publications</p> <p>Other required materials:</p> <p>[2] Erhard, Werner and Jensen, Michael C. and Zaffron, Steve and Zaffron, Steve and Echeverria, Jeronima, Course Materials for: 'Being a Leader and the Effective Exercise of Leadership: An Ontological/Phenomenological Model' (February 1, 2022). Harvard Business School NOM Working Paper No. 09-038, Simon School Working Paper No. 08-03, Barbados Group Working Paper No. 08-02, Available at SSRN: https://ssrn.com/abstract=1263835 or http://dx.doi.org/10.2139/ssrn.1263835</p>
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2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x	x				x	
2				x	x	x	x
3			x				

Intended Learning Outcomes (*ABET_Student Outcomes*)

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-4) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1a, 1.1b, 1.1c	1.2a, 1.2b	1.3c, 1.3d	2.1a, 2.1b	2.2a	2.3a	2.4c		
2		1.2a, 1.2b	1.3c, 1.3d	2.1a, 2.1b	2.2a, 2.2b		2.4a, 2.4b	2.5a	
3	1.1b,1 .1c		1.3a, 1.3b, 1.3c				2.4b	2.5a, 2.5b	2.6a, 2.6b

3. Planned learning activities and teaching methods

Week	Content	CLOs	Assessment	Learning Activities	Resources
1	Introduction	1.1, 1.2	HW	Lecture Project group forming Class Discussion Read Book	[1]
2	Already Always Listening	1.1, 1.2	HW, Midterm	Lecture Class Discussion Read Book	[1], [2]
3	Trait Approach	1.1, 1.2	HW, Midterm	Lecture Class Discussion Read Book	[1], [2]
4	Authentic Leadership	1.1, 1.2, 2.1	HW, Midterm	Lecture Class Discussion Read Book	[1], [2]
5	Integrity Part 1	1.1, 1.2, 2.1	HW, Midterm	Lecture Class Discussion Read Book	[1], [2]
6	Integrity Part 2	1.1, 1.2, 2.1	HW, Midterm	Lecture Class Discussion Read Book	[1], [2]
7	Skill Approach	1.1, 1.2, 2.1	HW, Midterm	Lecture Class Discussion Read Book	[1], [2]
8	Review for Midterm		Quiz	Class Discussion Problem solving	
9	Midterm Exam				
10	Foundation of Leadership	1.2, 2.1, 2.2	HW, Final	Lecture Class Discussion Read Book	[1], [2]
11	Adaptive Leadership	1.2, 2.1, 2.2	HW, Final	Lecture Class Discussion Read Book	[1], [2]
12	Behavior – Style Approach	1.2, 2.1, 2.2	HW, Final	Lecture Class Discussion Read Book	[1], [2]
13	Situational Approach	1.2, 2.1, 2.2	HW, Final	Lecture Class Discussion Read Book	[1], [2]
14	Power of Context	1.2, 2.1, 2.2	HW, Final	Lecture Class Discussion Read Book	[1], [2]
15	Presentation	2.1, 2.2, 3	Project	Presentation Class Discussion	
16	Review for Final				
17	Final Examination				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
Project (14%)	x	x	x
Homework, quiz, reflection (16%)		x	x
Midterm exam (30%)	x	x	x

Final exam (40%)	x	x	x
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Note: %Pass: Target 70% of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)			
	10		
TOTAL SCORE			
	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: June 2022

**Ho Chi Minh City, 2022
Dean of School of Industrial Engineering
and Management**

(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: INVENTORY MANAGEMENT

Course Code: **IS023IU**

1. General information

<i>Course designation</i>	This course is essential for students to have a thorough understanding of the philosophy, tools and techniques of inventory management. This course is aimed at providing the background and skills necessary for effective inventory management using a systems approach for an entire supply chain management. This course will cover the following contents: inventory models for deterministic demands, inventory models for stochastic demands, coordinated ordering, and inventory models for multiechelon systems.
<i>Semester(s) in which the course is taught</i>	1
<i>Person responsible for the course</i>	Assoc. Prof. Nguyen Van Hop
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson, project
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.):37.5 Private study including examination preparation, specified in hours ⁴⁸ :100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	

⁴⁸ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<p><i>Course objectives</i></p>	<p>This course aims to provide for student to:</p> <ul style="list-style-type: none"> ● Students understand basic concepts and key aspects of inventory ● Students understand the importance of inventory and its position within logistics and supply chain systems ● Students understand fundamental inventory control models (deterministic vs stochastic, single item vs multiple items, etc.) ● Students know how to determine when to re-order, safety stock level, and order quantity when demand is deterministic ● Students know how to determine when to re-order, safety stock level, and order quantity when demand is stochastic 									
<p><i>Course learning outcomes</i></p>	<p>Upon the successful completion of this course students will be able to:</p> <table border="1"> <thead> <tr> <th>Competency level</th> <th>Course learning outcome (CLO)</th> </tr> </thead> <tbody> <tr> <td>Knowledge</td> <td>CLO1. Understanding of concepts, key points, and primary challenges of inventory management based on Engineering, Scientific, and Economic knowledge. Able to build the framework to control and manage inventory system. Able to identify different issues and problems, and develop the KPIs to measure the performance to control and manage an inventory system.</td> </tr> <tr> <td>Skill</td> <td>CLO2. Apply engineering methods and holistic and systematic approaches to identify, formulate and solve different inventory control problems by using optimization tools and advanced knowledge of natural sciences, mathematics and engineering. Students are able to collect input data, analyze parameters, formulate and solve practical inventory problems, conduct detailed research, conduct experiments and analyze the solutions by evaluating, planning, choosing and applying adequate methods of modeling, simulation, design and implementation of technical and economic systems.</td> </tr> <tr> <td>Attitude</td> <td>CLO3. Develop teamworking (leadership, organize, plan, and manage the projects), soft and professional (communication, decision making) skills and apply ethical practices to handle issues in the working environment.</td> </tr> </tbody> </table>		Competency level	Course learning outcome (CLO)	Knowledge	CLO1. Understanding of concepts, key points, and primary challenges of inventory management based on Engineering, Scientific, and Economic knowledge. Able to build the framework to control and manage inventory system. Able to identify different issues and problems, and develop the KPIs to measure the performance to control and manage an inventory system.	Skill	CLO2. Apply engineering methods and holistic and systematic approaches to identify, formulate and solve different inventory control problems by using optimization tools and advanced knowledge of natural sciences, mathematics and engineering. Students are able to collect input data, analyze parameters, formulate and solve practical inventory problems, conduct detailed research, conduct experiments and analyze the solutions by evaluating, planning, choosing and applying adequate methods of modeling, simulation, design and implementation of technical and economic systems.	Attitude	CLO3. Develop teamworking (leadership, organize, plan, and manage the projects), soft and professional (communication, decision making) skills and apply ethical practices to handle issues in the working environment.
Competency level	Course learning outcome (CLO)									
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Attitude	CLO3. Develop teamworking (leadership, organize, plan, and manage the projects), soft and professional (communication, decision making) skills and apply ethical practices to handle issues in the working environment.									

<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (3 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Introduction to inventory management	1	I
	Inventory models for single item with time varying demand at approximate level	1	I, T, U
	Losizing models with time varying demand	2	I, T, U
	Inventory Management under Stochastic Demand	2	I, T, U
	Managing Class A Items	2	I, T, U
	Perisable Items	2	I, T, U
Multiple Items: Coordinated Ordering	2	I, T, U	
Multi-echelon Inventories	2	I, T, U	
<i>Examination forms</i>	Written Examination		
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/ Examination: Students must have more than 50/100 points overall to pass this course.		
<i>Reading list</i>	Textbooks: - Edward A. Silver, David F. Pyke, Rein Peterson:Inventory Management and Production Planning and Scheduling References: - Steven M. Bragg- Inventory Accounting a comprehensive guide- Wiley(2005) - Steven Axsater- Inventory Control- Springer(2015) - John A. Muckstadt, Amar Sapro- Principle of Inventory Management – Springer(2010)		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1 -7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x			x			x
2	x	x				x	
3			x	x	x		

Intended Learning Outcomes (ILO)

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*

2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1a, 1.1b, 1.1c	1.2a, 1.2b	1.3c, 1.3d	2.1a, 2.1b	2.2a	2.3a	2.4c	2.5b	2.6b
2	1.2a, 1.2b	1.3c, 1.3d	2.1a, 2.1b	2.2a, 2.2b		2.4a, 2.4b	2.5a		
3	1.1b, 1.1c		1.3a 1.3b 1.3c					2.5b	2.6a 2.6b

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to inventory management	1		Lecture Group forming. Class discussion Read book & lecture 2	
2	Inventory models for single item with time varying demand at approximate level	1, 2,3,4	Quiz/HW	Lecture Class discussion Read book & lecture 3.	
3	Lotsizing models with time varying demand	1, 2,3,4	Quiz/HW	Lecture Class discussion Read book & lecture 4.	
4	Lotsizing models with time varying demand	1, 2,3,4	Quiz/HW	Lecture Class discussion Read book & lecture 5.	
5	Inventory Management under Stochastic Demand	1, 2,3,4	Quiz/HW	Lecture Class discussion Read book & lecture 6.	
6	Inventory Management under Stochastic Demand	1, 2,3,4	Quiz/HW	Lecture Class discussion Read book & lecture 7	

7	Managing Classs A Items	1, 2,3,4	HW	Lecture Class discussion	
	Midterm		Written Exam		
8	Managing Classs A Items	1, 2,3,4	Quiz/HW	Lecture Class discussion Read book & lecture 9.	
9	Perisable Items	1, 2,3,4	Quiz/HW	Lecture Class discussion Read book & lecture 10.	
10	Perisable Items	1, 2,3,4	Quiz/HW	Lecture Class discussion Read book & lecture 11	
11	Multiple Items: Coordinated Ordering	1, 2,3,4	Quiz/HW	Lecture Class discussion Read book & lecture 12	
12	Multiple Items: Coordinated Ordering	1, 2,3,4	Quiz/HW	Lecture Class discussion Read book & lecture 13	
13	Multi-echelon Inventories	1, 2,3,4	Quiz/HW	Lecture Class discussion Read book & lecture 14	
14	Multi-echelon Inventories	1, 2,3,4	Quiz/HW	Lecture Class discussion	
15	Project Presentation	4,5	Project	Group Presentation	
	Final exam		Written Exam		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
Quizzes and homework (15%)	60% Pass	60% Pass	60% Pass	60% Pass	100% Pass
Project (15%)	60% Pass	60% Pass	60% Pass	60% Pass	100% Pass
Midterm Exam (30%)	60% Pass	60% Pass	60% Pass	60% Pass	90% Pass
Final Exam (40%)	60% Pass	60% Pass	60% Pass	60% Pass	90% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Semester Project Report	
Student:	HW/Assignment:
Date:	Evaluator:

	Max.	Score	Comments
Part 1. Problem (25%)			
Criterion 1: Problem Statement	10		
Criterion 2: Objectives of Study	5		
Criterion 3: Scope and Limitations	5		
Criterion 4: Literature Review	5		
Part 2. Proposed System Design and Solution (40%)			
Criterion 1: Proposed System	10		
Criterion 2: Proposed Solution	15		
Criterion 3: New Contribution	15		
Part 3. Results and Validation (35%)			
Criterion 1: Results	15		
Criterion 2: Validation	20		
TOTAL SCORE		100	

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: 10/5/2022

Ho Chi Minh City, 10/05/2022

**Dean of School of Industrial Engineering
and Management**

(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: Retail Management

Course Code: **IS082IU**

1. General information

Course designation	<i>This subject will provide the student with a comprehensive view of retailing and an application of marketing concepts in a practical retail managerial environment. As a potential marketing manager, this course will give students insight into the retailing environment of which students will be a part and allow students to make informed decisions in your interaction with retailers. The course also provides a good foundation for those interested in owning or running a small retail business or those interested in pursuing a retail career as a merchandise buyer or store manager.</i>
Semester(s) in which the course is taught	5
Person responsible for the course	MSc. Nguyen Hoang Huy
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, project.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, etc.): 37.5 Private study including examination preparation, specified in hours ⁴⁹ : 100
Credit points	3 (5 ECTS)
Required and recommended prerequisites for joining the course	None

⁴⁹ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

Course objectives	Students will be provided with skills of using data from a variety of sources, be introduced to basic retailing principles and the scope of retailing and current technology along with future trends in the retailing. Through this unit, students will be able to build a Retail Store, will take the student from learning concepts to the application of the concepts through the creation of a retail concept and marketing plan. Industry professionals will provide students with real world experiences in this process.																																			
Course learning outcomes	Upon the successful completion of this course students will be able to:																																			
	Competency level	Course learning outcome (CLO)																																		
	Knowledge	CLO1. Students have economic knowledge about basic retailing principles and the scope of retailing. CLO2. Students will understand current technology along with future trends in the retailing.																																		
	Skill	CLO3. Students are able to cooperate with others, organize and implement projects to build a Retail Store, will take the student from learning concepts to the application of the concepts through the creation of a retail concept and marketing plan. Industry professionals will provide students with real world experiences in this process and present project to class.																																		
Attitude	CLO4. Students are able to communicate appropriately and work effectively in a team composed of diverse characteristics.																																			
Content	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (3 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p> <table border="1"> <thead> <tr> <th>Topic</th> <th>Weight</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Introduction to the world of retailing</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Types of retailers</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Multichannel retailing</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Customer buying behavior</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Retail locations</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Retail site location</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Managing the Merchandise process</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Retail pricing</td> <td>1</td> <td>I, T</td> </tr> <tr> <td>Retail communication mix</td> <td>2</td> <td>I, T</td> </tr> <tr> <td>Store layout and design</td> <td>1</td> <td>I, T</td> </tr> </tbody> </table>			Topic	Weight	Level	Introduction to the world of retailing	1	I, T	Types of retailers	1	I, T	Multichannel retailing	1	I, T	Customer buying behavior	2	I, T	Retail locations	1	I, T	Retail site location	1	I, T	Managing the Merchandise process	1	I, T	Retail pricing	1	I, T	Retail communication mix	2	I, T	Store layout and design	1	I, T
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Retail communication mix	2	I, T																																		
Store layout and design	1	I, T																																		
Examination forms	Short-answer questions, exercises																																			

Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
Reading list	1) Michael Levy, Barton Weitz - Retailing Management, 8th Edition-McGraw-Hill_Irwin (2011) 2) “Retailing 7th Edition” , Dunne, Lusch and Carver, Southwestern Cengage Learning 3) “Logistics and Retail Management: Emerging Issues and New Challenges in the Retail Supply Chain, 3rd Edition”, John Fernie, Leigh Sparks, Kogan Page, 2009 4) “Retail Management: A Strategic Approach PIE 12E”, Barry Berman / Joel R. Evans

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1				x			x
2					x		
3		x					
4				x			

Intended Learning Outcomes (ILO)

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

ASIIN learning outcomes									
CLO	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1a, 1.1b, 1.1c		1.3c			2.3a	2.4c	2.5b	2.6b
2	1.1c		1.3b						2.6a
3		1.2b	1.3c	2.1a, 2.1b			2.4a	2.5a	
4	1.1b		1.3c					2.5b	2.6b

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Lecture 1: Introduction to the world of retailing	1		Lecture, Group work	[1]. 1
2	Lecture 2: Types of retailers	1	HW 1	Lecture, Group work	[1].2
3	Lecture 3: Multichannel retailing	1	HW 2	Lecture, Group work	[1].3
4 and 5	Lecture 4 and 5: Customer buying behavior	1,2	HW 3	Lecture, Group work	[1]. 4
6	Lecture 6: Retail locations	1,2	HW 4 (part 1)	Lecture, Group work	[1]. 7
7	Lecture 7: Retail site location and revision for Midterm exam	1,2	HW 4 (part 2)	Lecture, Group work	[1]. 8
8 and 9	Midterm				
10	Lecture 8: Managing the Merchandise process	1	HW 5	Lecture, Group work	[1]. 12. 13.
11	Lecture 9: Retail pricing	2	HW 6	Lecture, Group work	[1]. 14
12&13	Lecture 10: Retail communication mix	1,2		Lecture, Group work	[1]. 15
14	Lecture 11: Store layout and design	2		Lecture, Group work	[1]. 17
15	Group presentation and revision for final exam	3,4	Project	Group presentation	
16	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Group Project (20%)			Projects report and	Projects report and

			presentation (60%Pass)	presentation (60%Pass)
Homework exercises (10%)	HW1-5 50%Pass	HW3, HW4, HW6 50%Pass		
Midterm exam (30%)	Q1, Q2 50%Pass	Q3, Q4 50%Pass		
Final exam (40%)	Q1, Q2 50%Pass	Q3, Q4 50%Pass		

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1

Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears

				uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: March 23, 2022

Ho Chi Minh City, 23/03/2022
**Dean of School of Industrial Engineering
and Management**
(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: Experimental Design

Course Code: IS031IU

1. General information

<i>Course designation</i>	Statistical design of experiments refers to the process of planning the experiment so that appropriate data will be collected and analyzed by statistical methods, resulting in valid and objective conclusions. A well designed experiment not only reveals important information of a process or system, but is also cost efficient. This applied statistic course benefits tremendously for both engineers and researchers in many activities such as new product design, manufacturing process development and process improvement. Coverage includes factorial, fractional factorial experimental designs, blocking and confounding factors, regression modeling and response surface methodology.
<i>Semester(s) in which the course is taught</i>	7
<i>Person responsible for the course</i>	Dr. Pham Huynh Tram
<i>Language</i>	English
<i>Relation to curriculum</i>	Elective
<i>Teaching methods</i>	Lecture, project
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (lecture): 37.5 Private study including examination preparation, specified in hours ⁵⁰ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Engineering Probability and Statistics
<i>Course objectives</i>	Students are able to design experiments to test a hypothesis, analyze and interpret data

⁵⁰ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO1. Understand basic concepts of experimentation
	Knowledge	CLO2. Understand different types of experimental designs and their usages
	Skill	CLO3. Able to plan different types of experimental designs
Knowledge	CLO4. Able to apply knowledge of statistics to analyse experimental results	

<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (3 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Introduction to Design of Experiments <i>Strategy, applications, guidelines and basic principles</i>	1	I
	Review of Basic Statistical Methods <i>Sampling</i> <i>Inferences about the differences in means</i> <i>Inferences about the variances of normal distribution</i>	1	I
	Analysis of Variance <i>Single-factor analysis of variance</i> <i>Model adequacy checking</i> <i>Interpreting of the results</i> <i>Sample computer output</i> <i>Determining sample size</i> <i>Dispersion effects</i> <i>Regression approach</i> <i>Real economy application of a designed experiment</i>	1	I
	Experiments with Blocking Factors <i>Randomized block</i> <i>Latin square design</i> <i>Incomplete block designs</i>	2	T,U
	Factorial Experiments <i>Basic definitions and principles</i> <i>Two factors factorial design</i> <i>Blocking in factorial experiments</i>	1	T, U
	Two-level Factorial Designs <i>The 2² design, the 2³ design</i> <i>The general 2^k design</i> <i>Single replicate of the 2^k design</i>	1	T,U
	Factorial Experiments <i>Basic definitions and principles</i> <i>Two factors factorial design</i> <i>Blocking in factorial experiments</i>	1	T, U
Two-level Factorial Designs <i>The 2² design, the 2³ design</i> <i>The general 2^k design</i> <i>Single replicate of the 2^k design</i>	2	T, U	
Two-level Fractional Factorial Designs <i>One-half fraction of the 2^k design</i> <i>One quarter fraction of the 2^k design</i> <i>Blocking fractional factorials</i>	2	T,U	
Regression Modeling <i>Linear regression models</i> <i>Estimation of the parameters</i> <i>Hypothesis testing of the</i>	1	I	

	<i>parameters</i>		
	Response Surface Methodology <i>Method of steepest ascent</i> <i>Analysis of a second-order response surface</i> <i>Application to robust design</i>	2	I
<i>Examination forms</i>	Writing, project presentation		
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
<i>Reading list</i>	[1] D.C. Montgomery, Design and Analysis of Experiments, 7th ed., Wiley, 2009.		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	SLO						
	1	2	3	4	5	6	7
1						x	
2						x	
3						x	
4						x	

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a	1.3d		2.2b		2.4b	2.5a	
2		1.2a	1.3d		2.2b		2.4b	2.5a	
3		1.2a	1.3d		2.2b		2.4b	2.5a	
4		1.2a	1.3d		2.2b		2.4b	2.5a	

3. Planned learning activities and teaching methods

Week	Topic	CLOs	Assessment Activities	Resources
1	Introduction to Design of Experiments <i>Strategy, applications, guidelines and basic principles</i>	1	HW Midterm	[1].1
2	Review of Basic Statistical Methods <i>Sampling</i> <i>Inferences about the differences in means</i> <i>Inferences about the variances of normal distribution</i>	4	HW Midterm	[1].2
3	Analysis of Variance <i>Single-factor analysis of variance</i> <i>Model adequacy checking</i> <i>Interpreting of the results</i> <i>Sample computer output</i> <i>Determining sample size</i> <i>Dispersion effects</i> <i>Regression approach</i> <i>Real economy application of a designed experiment</i>	4	HW Midterm	[1].3
4 &5	Experiments with Blocking Factors <i>Randomized block</i> <i>Latin square design</i> <i>Incomplete block designs</i>	2 3 4	HW Midterm	[1].4
6	Factorial Experiments <i>Basic definitions and principles</i> <i>Two factors factorial design</i> <i>Blocking in factorial experiments</i>	2 3 4	HW Midterm	[1].5
7	Two-level Factorial Designs <i>The 2² design, the 2³ design</i> <i>The general 2^k design</i> <i>Single replicate of the 2^k design</i>	2 3 4	HW Midterm	[1].6
MIDTERM EXAMINATION				
8	Two-level Factorial Designs (cont) <i>Addition of center points to the 2^k design</i> <i>Blocking a replicated 2^k design</i> <i>Confounding in the 2^k design</i>		HW Final	[1].7
9&10	Two-level Fractional Factorial Designs <i>One-half fraction of the 2^k design</i> <i>One quarter fraction of the 2^k design</i> <i>Blocking fractional factorials</i>	2 3 4	HW Final	[1].8
11	Regression Modeling <i>Linear regression models</i> <i>Estimation of the parameters</i> <i>Hypothesis testing of the parameters</i>	2 3 4	HW Final	[1].10
12&13	Response Surface Methodology <i>Method of steepest ascent</i> <i>Analysis of a second-order response surface</i> <i>Application to robust design</i>	2 3 4	HW Final	[1].11
14	Group presentation			
15	Review for final			
FINAL EXAMINATION				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Project (20%)	x	x	x	x

Homework (10%)	x	x		x
Midterm exam (30%)	x	x		x
Final exam (40%)	x	x		x

Note: %Pass: Target 70% of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)			
	10		
TOTAL SCORE			
	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: April 2022

Ho Chi Minh City, 04/2022

**Dean of School of Industrial Engineering
and Management**

(Signature)

Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: MANUFACTURING PROCESSES

Course Code: **IS087IU**

1. General information

<i>Course designation</i>	<i>This subject will provide students with basic background about the manufacturing processes of products by using machining technologies such as casting, forging, welding, turning, milling, grinding, . . . These are the basic machining processes and common use; students can apply and develop in manufacturing areas for produce new products with advanced technologies.</i>
<i>Semester(s) in which the course is taught</i>	7
<i>Person responsible for the course</i>	Nguyen Van Chung
<i>Language</i>	English
<i>Relation to curriculum</i>	Elective
<i>Teaching methods</i>	Lecture, lesson, Assignment
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 Private study including examination preparation, specified in hours ⁵¹ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None
<i>Course objectives</i>	Students will be provided a fundamental and advanced concept of the manufacturing processes, understand the functions of machining technologies. Ability to use the technologies for manufacture new products with advanced machining processes.

⁵¹ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO1. Students will be able to Develop a fundamental and advanced concept of the manufacturing processes.
	Skill	CLO2. Students will be able to understand the functions of machining technologies
Attitude	CLO3. Ability to use the technologies for manufacture new products with advanced machining processes.	

<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>			
	Weight: lecture and practice session			
	Teaching levels: I (Introduce); T (Teach); U (Utilize)			
	Topic	Content	Weight (hour)	Level
	Introduction to Manufacturing	Manufacturing; Materials in manufacturing; Manufacturing Processes Chapter 1 (Rajender Singh) Chapter 1 (H.N. Gupta, et al)	1	I, T
	Properties of Materials	Properties of Materials, Classification of Engineering materials; Ferrous metals; Non-Ferrous metal; Chapter 7 (Rajender Singh) Chapter 2 (H.N. Gupta, et al) Chapter 4 (Mikell P. Groover)	1	I, T
	Mold and Casting	Introduction; Casting Technology; Metal casting Process. Chapter 12, 13 (Rajender Singh) Chapter 3, 4 (H.N. Gupta, et al)	2	T, U
	Forging	Classification of forging, Die forging, Machine forging Chapter 14 (Rajender Singh) Chapter 2 unit2 (H.N. Gupta, et al)	1	T, U
	Wedding	Wedding Process; Wedding Technology; Wedding Joints; Gas wedding processes; Arc wedding processes Chapter 17 (Rajender Singh) Chapter 9 (H.N. Gupta, et al) Chapter 29, 30 (Mikell P. Groover)	1	T, U
	Sheet metal working	Cutting Operation; Bending operations; Drawing Chapter 18 (Rajender Singh) Chapter 20 (Mikell P. Groover)		
Lathe Operations	Center Lathe, Cutting tools, chuck, lathe operation. Chapter 1 unit 3 (H.N. Gupta, et al) Chapter 20, 21 (Rajender Singh) Chapter 21, 22 (Mikell P. Groover)		T, U	
Midterm Exam				
Milling Operations	Basic milling process, Types of milling process, milling machines Chapter 4 unit 3 (H.N. Gupta, et al) Chapter 24 (Rajender Singh)	3	T, U	
Shaping Operations	Principle of working, cutting tools, shaping machine Chapter 2 unit 3 (H.N. Gupta, et al)	1	T, U	

		al) Chapter 23 (Rajender Singh)		
	Grinding Operations	Analysis of the Grinding Process; Application consideration in Grinding; Grinding operations and grinding machines Chapter 25 (Mikell P. Groover)	1	T, U
	Mechanical Advanced Machining Processes	Ultrasonic Machining; Water jet machining; Photochemical Milling; Electrodischarge machining; Laser beam machining Chapter 2, 3, 4, 5 (Hassan El- Hofy)	1	T, U
	Lab: Machining Operations: Turning, Drilling, Milling	Handout	2	U
Final Exam				
<i>Examination forms</i>	Answer questions			
<i>Study and examination requirements</i>	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>			

<i>Reading list</i>	<p>[1] Rajender Singh, <i>Introduction to basic Manufacturing Processes and Workshop Technology</i>, New Age International (P) Limited, 2006.</p> <p>[2] H.N. Gupta, R.C. Gupta, Arun Mittal, <i>Manufacturing Processes</i>, New Age International (P) Limited, Publishers 2009.</p> <p>[3] Mikell P. Groover <i>Fundamentals of Modern Manufacturing</i>, John Wiley & Son, 2010.</p> <p>[4] Hassan El-Hofy, <i>Advanced Machining Process</i>, Mc Graw – Hill, 2005</p> <p>[5] Kalpakjian and Schmid, <i>Manufacturing Engineering and Technology</i>, Prentice Hall, New Jersey, 2013.</p> <p>[6] DeGarmo, Black, and Kohser, <i>Materials and Processes in Manufacturing</i>, John Wiley & Sons, Inc, New York, 2011</p>
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2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2				x			
3						x	

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
2	1.1b		1.3c					2.5b	2.6b
3		1.2a	1.3d		2.2b		2.4b	2.5 a	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
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1	Introduction to Manufacturing	CLO 1		Lecture presentation, in-class discussion	Reading [1] , [2]
2	Properties of Materials	CLO 2	Quiz	Lecture presentation, in-class discussion	Reading [1] , [2], [3]
3	Mold and Casting	CLO 3	Exercises, HW, Quiz	Lecture presentation, in-class discussion	Reading [1] , [2]
4	Forging	CLO 3	Exercises, HW,	Lecture presentation, in-class discussion	Reading [1] , [2]
5	Welding	CLO 3	Exercises, HW,	Lecture presentation, in-class discussion	Reading [1] , [2], [3]
6	Sheet metal work	CLO 3	Exercises, HW,	Lecture presentation, in-class discussion	Reading [1] , [3]
7	Lathe Operations	CLO 3	Exercises, HW, Quiz	Lecture presentation, in-class discussion	Reading [1] , [3]
8-9	Midterm				
10-11	Milling Operations	CLO 3	Exercises, HW, Quiz	Lecture presentation, in-class discussion	Reading [1]
12	Shaping Operations	CLO 3	Exercises, HW	Lecture presentation, in-class discussion	Reading [1]
13	Grinding Operations	3	Exercises, HW	Lecture presentation, in-class discussion	Reading [3]
14-15	Mechanical Advanced Machining Processes	CLO 3	Exercises	Lecture presentation, in-class discussion	Reading [4]
16-17	Lab: Machining Operations: Turning, Drilling, Milling	CLO 3	Practice	Practice	Handout
18	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
In-class Exercises, quizzes, homework (15%)	Quiz, HW 60% Pass	Quiz, HW 60% Pass	
Assignment,lab (15%)		80% Pass	
Midterm exam (30%)	60% Pass	60% Pass	
Final exam (40%)		60% Pass	60% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)			
	10		
TOTAL SCORE			
	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: April 13th, 2022

Ho Chi Minh City, 13/04/2022

Dean of School of Industrial Engineering and Management

(Signature)

Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: FLEXIBLE MANUFACTURING SYSTEMS

Course Code: **IS043IU**

1. General information

<i>Course designation</i>	<i>This subject will provide the concept and method of flexible manufacturing system planning and control. The study covers: FMS technology, component, performance evaluation, and configuration planning.</i>
<i>Semester(s) in which the course is taught</i>	7
<i>Person responsible for the course</i>	Nguyen Van Chung
<i>Language</i>	English
<i>Relation to curriculum</i>	Elective
<i>Teaching methods</i>	Lecture, lesson, project
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 Private study including examination preparation, specified in hours ⁵² : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None
<i>Course objectives</i>	Students will be provided with skills of flexible manufacturing concepts; define the terms of Group Technology (GT) and apply GT concepts in a flexible manufacturing environment. Gain insight about the state-of-the-art research areas related to FMS and real-time shop floor control; plan and control flexible manufacturing system

⁵² When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO1. Enable to know flexible manufacturing concepts. Gain insight about the state-of-the-art research areas related to FMS and real-time shop floor control.
	Skill	CLO2. Define the terms of Group Technology (GT) and apply GT concepts in a flexible manufacturing environment. The components of FMS
Attitude	CLO3. To plan and control flexible manufacturing system.	

<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>			
	Weight: lecture and practice session			
	Teaching levels: I (Introduce); T (Teach); U (Utilize)			
	Topic	Content	Weight (hour)	Level
	Introduction to Flexible Manufacturing Systems	Flexibility; Introduction, Types of FMS FMS Application, Objectives of FMS Chapter 1 (H.K. Shivanand) Chapter 19 (Mikell P. Groover)	1	I, T
	Introduction to Flexible Manufacturing Cell	Definition of Cell, Single – station manual/automated Cells, FMC, Differences between FMC and FMS Chapter 2 (H.K. Shivanand) Chapter 13, 14 (Mikell P. Groover)	1	I, T
	Group Technology - Part classification – Coding systems	Introduction, Part families, Machine groups, Coding systems. Chapter 4 (H.K. Shivanand) Chapter 18 (Mikell P. Groover)	2	T, U
	Group Technology – Production Flow Analysis	Production flow analysis, Benefits of Group Tecnology Chapter 4 (H.K. Shivanand) Chapter 8 (Mikell P. Groover)	2	T, U
	Components of FMS	Workstations, Material Handling and storage system, Computer control system, FMC/FMS components Chapter 18, 19 (Mikell P. Groover)	1	T, U
	Midterm Exam			
	Automated Material Movement and Storage system	Automation in production systems; Fundamentals and applications of automated production/assembly lines, Analysis of transfer lines, AGV, ASRS, Industrial Robot Chapter 8 (H.K. Shivanand) Chapter 16 (Mikell P. Groover)	2	T, U
	FMS software structure, functions, and Description	General Structure and Requirements, Activities and Functions to be Performed by FMS Software, Types of FMS Software Modules Chapter 11 (H.K. Shivanand)	2	U
FMS Installation and Implementation	FMS Installation, FMS implementation Chapter 12 (H.K. Shivanand)	1	U	
Computer Aided Process Planning	Introduction to CAPP, Approaches to process planning, Approaches to CAPP Chapter 16 (Mikell P. Groover)	1	T, U	
Lab: OpenCIM	Operation of openCIM OpenCIM, Intelitek	2	U	

	Final Exam
<i>Examination forms</i>	Answer questions
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
<i>Reading list</i>	[1] H.K. Shivanand, M.M. Benal, V. Koti, <i>Flexible manufacturing System</i> , New Age International limited, Publishers, 2006. [2] Mikell P. Groover, <i>Automation, Production Systems, and Computer-Integrated Manufacturing</i> , 3rd edition, Prentice Hall, 2007. [3] Horst Tempelmeier, Heinrich Kuhn, <i>Flexible Manufacturing Systems: Decision Support for Design and Operation</i> , John Wiley & Sons, 1993. [4] TekLink, CIM Technology 1, OpenCIM, Intelitek, 2003

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2				x			
3						x	

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*

6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a,1.2b	1.3d	2.1a,2.1b	2.2a				
2	1.1b		1.3c					2.5b	2.6b
3		1.2a	1.3d		2.2b		2.4b	2.5a	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Flexible Manufacturing Systems	CLO 1		Lecture presentation, in-class discussion	Reading [1] , [2]
2	Introduction to Flexible Manufacturing Cell	CLO 1	Quiz	Lecture presentation, in-class discussion	Reading [1] , [2],
3-4	Group Technology - Part classification – Coding systems	CLO 2	Exercises, HW,	Lecture presentation, in-class discussion	Reading [1] , [2]
5-6	Group Technology – Production Flow Analysis	CLO 2	Exercises, HW, Quiz	Lecture presentation, in-class discussion	Reading [1] , [2]
7	Components of FMS	CLO 2	Exercises	Lecture presentation, in-class discussion	Reading [2]
8-9	Midterm				
10-11	Automated Material Movement and Storage system	CLO 2 CLO 3	Exercises, Quiz	Lecture presentation, in-class discussion	Reading [1], [2]
12	FMS software structure, functions, and Description	CLO 2 CLO 3	Exercises	Lecture presentation, in-class discussion	Reading [1], [3]
13	FMS Installation and Implementation	CLO 3	Exercises	Lecture presentation, in-class discussion	Reading [1], [3]
14-15	Computer Aided Process Planning	CLO 3	Exercises	Lecture presentation, in-class discussion	Reading [2]
16-17	Lab: OpenCIM, Lathe, Milling	CLO 3	Practice	Practice	Handout, Reading [4]
18	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
In-class Exercises, quizzes, homework (15%)	Quiz, HW 60% Pass	Quiz, HW 60% Pass	

Assignment, Lab (15%)		80% Pass	
Midterm exam (30%)	60% Pass	60% Pass	
Final exam (40%)		60% Pass	60% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis

	information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: April 13th, 2022

Ho Chi Minh City, 13/04/2022

**Dean of School of Industrial Engineering
and Management**

(Signature)

Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: INTERNATIONAL TRANSPORTATION & LOGISTICS

Course Code: IS067IU

1. General information

<i>Course designation</i>	<i>This course will provide the students with an understanding of both the fundamental role and importance of transportation and logistics in companies and in our society, and the complex environment in which transportation and logistics service is provided today. This course takes a managerial approach to teaching transportation and logistics concepts and issues, providing students the tools to adapt to this fast-paced and rapidly changing industry.</i>
<i>Semester(s) in which the course is taught</i>	7
<i>Person responsible for the course</i>	Assoc. Prof. Dr Ho, Thi Thu Hoa
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson, discussion, project.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 37.5 Private study including examination preparation, specified in hours ⁵³ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None

⁵³ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course objectives</i>	Students will be provided with knowledge and skills of fundamental principles, concepts, operations processes of international transportation and logistics. Students will be able to apply the real-world concepts developed to a range of situations including the workplace and further study in their careers path and lifelong learning.	
<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO1. Students will be able to describe key concepts and scope of international transportation and logistics CLO2. Students will be able to analyze transportation costing and pricing, carrier strategy, information management and emerging technologies, transportation management strategy and process and propose solutions in the area of international transportation and logistics
	Skill	CLO3. Students will be able to apply various methods to design international transportation and logistics systems.
	Attitude	CLO4. Students will have positive attitude in both self-learning and group project with other disciplines related to international transportation and logistics, especially solving related problems.

<p><i>Content</i></p>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture and practice session (3 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p>		
<p>Topic</p> <p>Introduction to Transportation and Logistics in Supply Chain</p> <ul style="list-style-type: none"> ✓ <i>Transportation and Logistics in Supply chain</i> ✓ <i>Global Flows and Trade</i> ✓ <i>Economics of Transportation</i> ✓ <i>Transportation Planning</i> 	<p>Weight (hour)</p> <p>3</p>	<p>Level</p> <p>I</p>	
<p>Costing and Pricing for Transportation</p> <ul style="list-style-type: none"> ✓ <i>Market Considerations-Rates vs. Price</i> ✓ <i>Cost-of-service Pricing vs. Value-of-service Pricing Economics of Transportation</i> ✓ <i>Rate Making in Practice</i> ✓ <i>Pricing in Transportation Management</i> 	<p>3</p>	<p>I, T, U</p>	
<p>Modes of Transport</p> <ul style="list-style-type: none"> ✓ <i>Overview of Transport modes</i> ✓ <i>Road transport</i> ✓ <i>Rail transport</i> ✓ <i>Air transport</i> ✓ <i>Maritime transport</i> ✓ <i>Inland waterway transport</i> ✓ <i>Pipeline</i> ✓ <i>Multimodal transport</i> 	<p>9</p>	<p>I, T, U</p>	
<p>Private Transportation and Fleet Management</p> <ul style="list-style-type: none"> ✓ <i>Private Transportation</i> ✓ <i>Modal Types of Private Transportation</i> ✓ <i>Private Trucking & Cost Analysis</i> 	<p>3</p>	<p>I, T, U</p>	
<p>Third Party Logistics</p> <ul style="list-style-type: none"> ✓ <i>Outsourced Logistics Providers</i> ✓ <i>Overview of the 3PL Industry</i> ✓ <i>Overview of 3PL Users</i> ✓ <i>Establishing and Managing 3PL Relationships</i> ✓ <i>Strategic Needs of 3PL Users</i> 	<p>6</p>	<p>I, T, U</p>	
<p>Global Transportation</p>	<p>6</p>	<p>I, T, U</p>	

	<ul style="list-style-type: none"> ✓ <i>Overview of Global Transportation</i> ✓ <i>Global Transportation Planning - Incoterms</i> ✓ <i>Global Transportation Execution</i> ✓ <i>Issues and Challenges for Global Supply Chains</i> 			
	<p>Transportation Risk Management</p> <ul style="list-style-type: none"> ✓ <i>The Concept and role of Risk management</i> ✓ <i>The Basic Risk Types</i> ✓ <i>Transportation Risk Management Process and Techniques</i> ✓ <i>Security Regulations and Initiatives</i> 	3		I, T, U
	<p>Transportation Planning: Supply and Demand</p> <ul style="list-style-type: none"> ✓ <i>Transportation Supply</i> ✓ <i>Transportation Demand</i> 	3		I, T, U
	<p>Route choice and static assignment</p> <ul style="list-style-type: none"> ✓ <i>Route Choice Models</i> ✓ <i>Assignment with Implicit Path Enumeration</i> 	3		I, T
	<p>Transport Supply Network Design</p> <ul style="list-style-type: none"> ✓ <i>Transportation Supply Design Problem</i> ✓ <i>Models for Road Network Layout Design</i> ✓ <i>Models for Road Network Capacity Design</i> 	3		I, T
	<p>Group presentation and final exam preparation</p>	3		U
<i>Examination forms</i>	Short-answer questions, Case-answer questions			
<i>Study and examination requirements</i>	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>			

<i>Reading list</i>	<ol style="list-style-type: none"> 1. Coyle, John J., Robert A. Novack, Brian J. Gibson (2016), <i>Transportation A global supply chain perspective</i>, 8th edition. South-Western Cengage, Boston. (Core book) 2. E. Cascetta (2009), <i>Transportations systems analysis: models and applications</i>. Springer 3. Alan Harrison and et. (2014), <i>Logistics management and strategy competing through the supply chain (fifth edition)</i>, Pearson 4. Thorben Seiler (2012), <i>Operative Transportation Planning Solutions in Consumer Goods Supply Chains</i>. Springer 5. Rodrigue, J-P., Comitos, C., Slack, B. (2013) <i>The Geography of Transport Systems</i>, 3rd ed, Routledge: Albington 6. Incoterms 2020
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2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2		x					
3						x	
4					x		

Intended Learning Outcomes (ILO)

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a,1.2b	1.3d	2.1a, 2.1b	2.2a				
2	1.1b		1.3c	2.1 a 2.1 b			2.4a	2.5a	
3		1.2 a	1.3 d		2.2b		2.4b	2.5 a	
4	1.1 c		1.3 b						2.6 a

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Transportation and Logistics in Supply Chain	1		Lecture, discussion, Q&A	[1]. Chapter 1
2	Costing and Pricing for Transportation	1,2	HW1.1	Warm up and review, lecture, discussion, Q&A	[1]. Chapter 4
3-4-5	Modes of Transport	1,2	HW1.2	Warm up and review, lecture, discussion, Q&A	[2]. Chapter 5-6-7-8
6	Private Transportation and Fleet Management	1, 2	HW2.1	Warm up and review, lecture, discussion, Q&A	[1]. Chapter 13
7-8	Third Party Logistics	2, 3	HW2.2	Warm up and review, lecture, discussion, role play, Q&A	[1]. Chapter 12
9-10	Midterm				
11-12	Global Transportation	3	HW3.1	Warm up and review, lecture, discussion, Q&A	[1]. Chapter 10, 11, 14 [6] Incoterms 2020
13	Transportation Risk Management	1,2	HW3.2	Warm up and review, lecture, discussion, Q&A	[1]. Chapter 9
14	Transportation Planning: Supply and Demand	1,2	HW3.3	Warm up and review, lecture, discussion, Q&A	[2]. Chapter 2-5-9
15	Route choice and static assignment	2, 3	HW4.1	Warm up and review, lecture, discussion, Q&A	[2]. Chapter 5
16	Transport Supply Network Design	2, 3	HW4.2	Warm up and review, lecture, discussion, Q&A	[2]. Chapter 9
17	Group presentation and final exam preparation	3, 4	Presentation	Warm up and review, group work presentation, Q&A	
18	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
In-class assignment (10%)	HW 1 60% Pass	HW2 60% Pass	HW3-HW4 60% Pass	
Group projects (20%)				Group project 80% Pass
Midterm exam (30%)	60% Pass	60% Pass		

Final exam (40%)		60% Pass	60% Pass	
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Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: April 15th, 2022

Ho Chi Minh City, 15/04/2022

**Dean of School of Industrial Engineering
and Management**

(Signature)

Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: Creative thinking

Course Code: **IS080IU**

1. General information

<i>Course designation</i>	This course highlights creative thinking process, mindset, skills and tools.
<i>Semester(s) in which the course is taught</i>	7
<i>Person responsible for the course</i>	Dr. Pham Huynh Tram
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson, project, seminar.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours (lecture): 37.5 Private study including examination preparation, specified in hours ⁵⁴ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	Critical thinking
<i>Course objectives</i>	Deliberate creative thinking is learnable. This course helps students uncover their creative potential by learning creative thinking process, mindset, skills and tools. The course is designed based on experiential learning through watching, reading, self reflection, discussions and project. Students are invited to survey and practice creative thinking tools, explore and develop their own creative processes, and experience collaborative creative problem solving in teams. Invited speakers will present their stories and experiences with creative processes.

⁵⁴ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:		
	Competency level	Course learning outcome (CLO)	
	Knowledge	CLO1. Understand the creative thinking process and recognize its barriers	
	Skill	CLO2. Utilize creative thinking tools for solving problems	
	Attitude	CLO3. Have a creative thinking mindset	
<i>Content</i>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (3 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p>		
	Topic	Weight	Level
	Basic tools for creative thinking - divergent/convergent thinking; wishes; assumption busting; GPS	1	U
	Intro to Creative Process	1	I
	Spark a revolution. – Reframe the problem	2	T, U
	Bring in the bees – Connect & combine	1	T,U
	Build, build, build, jump – Think better	1	T, U
	Are you paying attention	1	T,U
	Think of coconuts – Constraints	1	T, U
	Marshmallow on top – Teamwork	1	T, U
	Move fast, break things. – Experiment If anything can go wrong, FIX IT – Mindset	2	T,U
	Intro to Design thinking	2	I, T
	Inside out & outside in – everythingtogether	1	I
	Learning from experts	2	I
<i>Examination forms</i>	Writing, project presentation		
<i>Study and examination requirements</i>	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>		
<i>Reading list</i>	<p>[1] “Creativity”: InGenius: A Crash Course on Creativity, Tina Seelig</p> <p>[2] Thinkertoys – A handbook of creative thinking techniques, Michael Michalko (2006)</p> <p>[3] Tharp, T. (2005). The Creative Habit: Learn It and Use It for Life: A Practical Guide. New York: Simon & Schuster Paperbacks</p>		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (SLO) (1-6) is shown in the following table:

CLO	SLO						
	1	2	3	4	5	6	7
1	x			x	x		x
2	x			x	x		x
3	x			x	x		x

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1a, 1.1b 1.1c	1.2a 1.2b	1.3b 1.3c 1.3d	2.1a 2.1b	2.2a	2.3a	2.4c	2.5b	2.6a 2.6b
2	1.1a, 1.1b 1.1c	1.2a 1.2b	1.3b 1.3c 1.3d	2.1a 2.1b	2.2a	2.3a	2.4c	2.5b	2.6a 2.6b
3	1.1a, 1.1b 1.1c	1.2a 1.2b	1.3b 1.3c 1.3d	2.1a 2.1b	2.2a	2.3a	2.4c	2.5b	2.6a 2.6b

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Basic tools for creative thinking - divergent/convergent thinking; wishes; assumption busting; GPS	2	HW	Class exercise	
2	Learning from experts- Expert presentation	1,3		Presentation	

3	Intro to Creative Process	1		Video watching	[1].0
4	Spark a revolution. – Reframe the problem	2,3	HW	Class exercise	[1].1
5	Bring in the bees – Connect & combine	2,3	HW	Class exercise Presentation	[1].2,[2].
6	Build, build, build, jump – Think better	2,3	HW	Class exercise Presentation	[1].3,[2].
7	Are you paying attention	2,3	HW	Class exercise Presentation	[1].4
8	Think of coconuts – Constraints	2,3	HW	Class exercise Presentation	[1].6
9	Midterm		Reflection writing		
10	Marshmallow on top – Teamwork	1,3	HW	Class exercise Presentation	[1].8
11	Move fast, break things. – Experiment If anything can go wrong, FIX IT – Mindset	1,3	HW	Class exercise Presentation	[1].9
12	Intro to Design thinking	1,3	HW	Class exercise Presentation	
13	Inside out & outside in – everythingtogether	1,3	HW	Class exercise Presentation	[1].11
14	Learning from experts- Expert presentation	1,3		Presentation	
15	Final exam		Project presentation		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
In-class exercises (20%)		70% Pass	70% Pass
Homework exercises (10%)	70% Pass		
Midterm exam (30%)	Reflection writing 70% Pass		
Final exam (40%)	Presentation 70% Pass		Presentation 70% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)			
TOTAL SCORE			
	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone 4	Milestone		Benchmark 1
		3	2	
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: April 2022

Ho Chi Minh City, 04/2022

**Dean of School of Industrial Engineering and
Management**

(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SPECIFICATION

COURSE SYLLABUS

SYLLABUS OF INTERNSHIP, CAPSTONE, THESIS COURSES



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: Internship 1

Course Code: IS052IU

1. General information

<i>Course designation</i>	<i>This course is an internship and is designed to supplement traditional classroom-based learning with experiential learning.</i>
<i>Semester(s) in which the course is taught</i>	1,2,3
<i>Person responsible for the course</i>	<i>MSc. Duong Vo Nhi Anh.</i>
<i>Language</i>	English
<i>Relation to curriculum</i>	<i>Compulsory</i>
<i>Teaching methods</i>	Lecture, lesson, project, seminar.
<i>Workload (incl. contact hours, self-study hours)</i>	<i>(Estimated) Total workload: 100</i> <i>Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 0</i> <i>Private study including examination preparation, specified in hours⁵⁵: 100</i> <i>A minimum of 15 working days is required (5 days visit factory, 5 days write report, 5 days to get approval from supervisor).</i>
<i>Credit points</i>	2 (4 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None
<i>Course objectives</i>	The internship provides students with the opportunity to practically apply knowledge gained in their courses of Industrial & Systems Engineering.

⁵⁵ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO1. Students apply specialized knowledge through observing the operating processes of real companies. CLO2. Students have Academic research and writing: Empiricism understanding, methods of academic research and writing
	Skill	CLO3. Students are able to identify, abstract and structure technical and economic tasks and problems.
	Attitude	CLO4. Students will have integrative knowledge of soft skills, practical knowledge and foreign language.
<i>Content</i>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Internships can be with a variety of host organizations, including foreign companies, government agencies and private industries. A minimum of 15 working days is required (5 days visit factory, 5 days write report, 5 days to get approval from supervisor). Whether the students have arranged their internship themselves or have been assisted in arranging one by the program assistant or other lecturers, they should let the program assistant know once there is a problem with the internship. The program coordinator can either intervene appropriately or see if the students can be transferred to a different company.</p>	
<i>Examination forms</i>	Report	
<i>Study and examination requirements</i>	<p>Class Participation: Students must complete the following forms and requirements:</p> <ul style="list-style-type: none"> - Internship Registration: register internship through Edu soft or form. - Internship Application and Student Performance Record. - Supervisor & Advisor Evaluations: This questionnaire helps ensure that the ISE receives a complete and fair assessment of each student's performance from the site supervisor and advisor. At the completion of the internship, students are responsible for requesting their site supervisor and advisor to complete, and send this form to their advisor and then submit to the Program Assistant. - Final Report: In order to receive credit and a final grade for an approved internship students, must submit the final report. See below for suggested final report requirements. This report is to be completed by the student and must be submitted to the Program Assistant no later than the due date (to be defined later). 10 points will be deducted from your final grade when the final report is submitted late. <p>Academic Honesty and Plagiarism: Instances of academic dishonesty will not be tolerated. Fabrication (Falsifying or inventing any information, citation, or data) or plagiarism (presenting the work of another as your own, or the use of another person's ideas without giving proper credit) will result in a failing grade. For this class, all reports are to be completed by the individual student unless otherwise specified. Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for preparation, research, drafting, and the proper referencing of sources in preparing all assessment items.</p>	
<i>Reading list</i>		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						x
2	x						
3						x	
4				x			x

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The relationship between Course Learning Outcomes (CLO) (1-4) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1a 1.1b 1.1c	1.2a 1.2b	1.3c, 1.3d	2.1b 2.1a	2.2a	2.3a	2.4c		
2		1.2a 1.2b	1.3d	2.1a, 2.1b	2.2a				
3		1.2a	1.3d		2.2b		2.4b	2.5a	
4	1.1a 1.1b 1.1c		1.3c			2.3a	2.4c		2.6a

3. Planned learning activities and teaching methods

Day	Content	CLOs (Gx.x)	Teaching and Learning activities		Assessment Activities
			Lecture	Student	
1	Lecture 1: Observation factory 1	CLO1,2, 3,4	Lecture	Group forming	Quiz
2	Lecture 2: Observation factory 2	CLO1,2, 3,4	Lecture	Group forming	Quiz
3	Lecture 3: Observation factory 3	CLO1,2, 3,4	Lecture	Group forming	Quiz/HW
4	Lecture 4: Observation	CLO1,2, 3,4	Lecture	Group forming	Quiz/HW

	factory 4				
5	Lecture 5: Observation factory 5	CLO1,2, 3,4	Lecture	Group forming	Homework
<i>Final report</i>					

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Quizzes and homework (15%)	60% Pass	60% Pass	60% Pass	60% Pass
Project (15%)	60% Pass	60% Pass	60% Pass	60% Pass
Midterm Exam (30%)	60% Pass	60% Pass	60% Pass	60% Pass
Final Exam (40%)	60% Pass	60% Pass	60% Pass	60% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response

4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1

Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised:

Ho Chi Minh City, 2022
Dean of School of Industrial
Engineering and Management
(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS
Course Name: Internship 2
Course Code: IS053IU

1. General information

<i>Course designation</i>	<i>This course is an internship and is designed to supplement traditional classroom-based learning with experiential learning. The internship provides students with the opportunity to practically apply knowledge gained in their courses of Industrial & Systems Engineering.</i>
<i>Semester(s) in which the course is taught</i>	3
<i>Person responsible for the course</i>	MSc. Duong Vo Nhi Anh.
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Lecture, lesson, project, seminar.
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 165 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 0 Private study including examination preparation, specified in hours ⁵⁶ : 165
<i>Credit points</i>	3 (6 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	None
<i>Course objectives</i>	Student will be able to have practical work experience under supervision and guidance, have ability to apply theories and principles learned in academic coursework to specific situations with the internship experience, ability to learn by observing and analyzing the daily functioning of the work place and reflecting on how people within the organization carry out its mission, get motivated and confident about career options after graduating.

⁵⁶ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO 1. Students will be able to understand different kinds of production and the background and philosophies of lean production, method to analyze existing systems and identify different kinds of waste.
	Skill	CLO 2. Students will be able to identify, abstract, and apply approaches used in implementing lean production such as 5S, stability, pull production, cellular arrangement and layout improvement, quick change
	Attitude	CLO 3. Students will have integrative knowledge of soft skills and foreign language, total productive maintenance, mistake reduction, standards, leveling, visual management to real-life problems
<i>Content</i>	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Internships can be with a variety of host organizations, including foreign companies, government agencies and private industries. A minimum of 320 working hours or 40 working days is required. Whether the students have arranged their internship themselves or have been assisted in arranging one by the program assistant or other lecturers, they should let the program assistant know once there is a problem with the internship. The program coordinator can either intervene appropriately or see if the students can be transferred to a different company. Students should be both supported and challenged and encouraged to take initiative and develop life-long learning skills. Each intern works under a site supervisor at the host organization and an advisor from IU (ISE's lecturer). The role of the site supervisor (or advisor) is to oversee the students and provide mentorship throughout the internship. The site supervisor and advisor will complete a performance evaluation form at the conclusion of the internship. Students will discuss their experiences through weekly reports and online discussions.</p>	
<i>Examination forms</i>	Report	
<i>Study and examination requirements</i>	<p><i>Report:</i> Students must have more than 50/100 points overall to pass this course.</p> <p><i>Attendance:</i> A minimum of 320 working hours or 40 working days is required.</p>	
<i>Reading list</i>		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1-7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x						
2	x	x				x	
3					x		x

Intended Learning Outcomes

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1		1.2a 1.2b	1.3d	2.1a 2.1b	2.2a				
2		1.2a 1.2b	1.3c 1.3d	2.1a, 2.1b	2.2a		2.4a, 2.4b	2.5a	
3	1.1a 1.1b, 1.1c		1.3b 1.3c			2.3a	2.4c		2.6a

3. Planned learning activities and teaching methods

Week	Content	CLOs (Gx.x)	Teaching and Learning activities		Assessment Activities
			Supervisor	Student	
1,2,3	Observation analysis and find out problem 1	CL01, 02,03	presentation	Class discussion	Quiz/HW
4,5,6	Observation analysis and find out problem 2	CL01, 02,03	presentation	Class discussion	Quiz/HW
7,8,9	Observation analysis and find out problem 3	CL01, 02,03	presentation	Class discussion	Quiz/HW
10,11, 12	Observation analysis and find out problem 4	CL01, 02,03	presentation	Class discussion	Quiz/HW
Final report					

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
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Quizzes and homework (15%)	60% Pass	60% Pass	60% Pass
Project (15%)	60% Pass	60% Pass	60% Pass
Midterm Exam (30%)	60% Pass	60% Pass	60% Pass
Final Exam (40%)	60% Pass	60% Pass	60% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone 4	Milestone 3	Milestone 2	Benchmark 1
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Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears

				uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: April 12, 2022

Ho Chi Minh City, 12/04/2022

**Dean of School of Industrial Engineering
and Management**

(Signature)

Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: CAPSTONE DESIGN

Course Code: IS083IU

1. General information

<i>Course designation</i>	<i>This subject is a preparation step for thesis and helps student to review their jobs after internship 2. It also helps students know how to identify the problem, review related literatures, and develop initial system for solving the current problem of a case.</i>
<i>Semester(s) in which the course is taught</i>	2
<i>Person responsible for the course</i>	Assoc. Prof. Nguyen Van Hop
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Project
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 137.5 Contact hours: 37.5) Private study including report and presentation preparation, specified in hours ⁵⁷ : 100
<i>Credit points</i>	3 (5 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	
<i>Course objectives</i>	Capstone project is a semester-long course taken at the senior year. Students engage in a research project focused on economic, social and environmental problems to study a current system, identify the possible problem, and explore in literature published research achievements in a research field that students have already agreed upon with potential thesis advisors in order to support and develop in thesis later. This research is individual work. Students and advisors meet to discuss together as much as needed. In the result, students have to develop a prototype module or system with the basic level requirements that it can improve and develop in the thesis.

⁵⁷ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:		
	Competency level	Course learning outcome (CLO)	
	Knowledge		
	Skill	CLO1. Know how to study a current system. Know how to identify a specific problem that related to the economic, social and environmental consideration. CLO2. Apply engineering methods and holistic and systematic approaches to formulate and solve practical problem. Be able to conduct literature review related to the specific topic, collect sources information and analyze parameters, evaluate, choose, and apply adequate methods of modeling, simulation, design and implementation of technical and economic systems. Be able to develop a prototype system or an intial solution of the problem and conduct experiments and analyze the solutions using optimization tools and advanced knowledge of natural sciences, mathematics and engineering.	
Attitude	CLO3. Develop teamworking (leadership, organize, plan, and manage the projects), soft and professional (communication, decision making) skills and apply ethical practices to handle issues in the working environment.. No cheating, regular meetings, team working, on-time reports. Be able to report and defend their research in both writing and speaking format.		
<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (3 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Select the research topics and determine the case study.	1 hr	I, U
	Identify the specific problem, objective of study and scopes.	3 hrs	I, U
	Search the related papers in research field and make literature review.	6 hrs	I, U
	Develop the system to figure out the solution for the studied problem	8 hrs	U
	Implement the solution method	12 hrs	U
Data collection and validate the proposed system.	12 hrs	U	
Write a final report and make presentation.	3 hrs	U	
<i>Examination forms</i>	Presentation, Report.		
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the weekly meetings. Students will be assessed on the basis of their working outputs. Examination: Students must have more than 50/100 points overall to pass this course.		

<i>Reading list</i>	Textbooks:
	- Depending on specific problems
	References:
	- Published scientific articles and technical documents

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-3) and Intended Learning Outcomes (ILO) (1 -7) is shown in the following table:

CLO	ILO						
	1	2	3	4	5	6	7
1	x			x			
2	x	x				x	x
3			x	x	x		

Intended Learning Outcomes (ILO)

Criteria for Accrediting Engineering Programs, 2020-2021

1. *an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
2. *an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
3. *an ability to communicate effectively with a range of audiences*
4. *an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
5. *an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
6. *an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
7. *an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1b	1.2a, 1.2b	1.3c, 1.3d	2.1a, 2.1b	2.2a			2.5b, 2.6b	
2	1.1a,1.1b,1.1c	1.2a, 1.2b	1.3c, 1.3d	2.1a, 2.1b	2.2a, 2.2b	2.3a	2.4c		
3	1.1b,1.1c		1.3a, 1.3b,1.3c					2.5b	2.6a, 2.6b

3. Planned learning activities and teaching methods

It depends on the individual work between students and advisors, including main contents:

1. Select the research topics and find out the specific problem.
2. Identify the specific problem in each situation and proposed methods.
3. Search the related papers in research field and make literature review.
4. Test the proposed system with small size problem.
5. Write a final report and make presentation.

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
Final Report (80%)	Final Report 60% Pass	Final Report 60% Pass	Final Report 60% Pass
Final Presentation (20%)	60% Pass	60% Pass	Final Presentation 60% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist			
Student:	Topic:		
Date:	Evaluator:		
	Max.	Score	Comments
Chapter 1: Introduction (15%)			
Criterion 1: Problem statement	5		
Criterion 2: Objectives of Study	5		
Criterion 3: Scope and Limitations	5		
Chapter 2: Literature Review (15%)			
Criterion 1: Current System	2		
Criterion 2: Related Works	10		
Criterion 3: Research Gap(s) and Key Ref.	3		
Chapter 3: Proposed System (30%)			
Criterion 1: Methodology Selection	15		
Criterion 2: Proposed Solution	15		
Chapter 4: Implementation and Validation (30%)			
Criterion 1: Solution Implementation	15		
Criterion 2: Validation	15		
Chapter 4: Report and Presentation (10%)			
Criterion 1: Report	5		
Criterion 2: Presentation	5		
TOTAL SCORE		100	

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

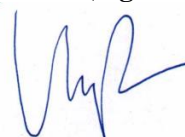
	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.

Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: 10/5/2022

Ho Chi Minh City, 10/05/2022
**Dean of School of Industrial Engineering
and Management**
(Signature)



Dr. Nguyen Van Hop



VIETNAM NATIONAL UNIVERSITY HCMC
INTERNATIONAL UNIVERSITY
School of Industrial Engineering and Management

COURSE SYLLABUS

Course Name: THESIS RESEARCH

Course Code: **IS048IU**

1. General information

<i>Course designation</i>	<i>This subject is a comprehensive study to develop problem solving skills for students. It also helps students know how to identify the problem, review related literatures, design a system for solving the problem, improve the current system, validate and analyze the results, and utilize all related knowledge to solve efficiently the problem..</i>
<i>Semester(s) in which the course is taught</i>	1, 2
<i>Person responsible for the course</i>	Assoc. Prof. Nguyen Van Hop
<i>Language</i>	English
<i>Relation to curriculum</i>	Compulsory
<i>Teaching methods</i>	Project
<i>Workload (incl. contact hours, self-study hours)</i>	(Estimated) Total workload: 450 Contact hours: 0 Private study including report and presentation preparation, specified in hours ⁵⁸ : 450
<i>Credit points</i>	10 (16.4 ECTS)
<i>Required and recommended prerequisites for joining the course</i>	
<i>Course objectives</i>	Thesis project is a semester-long, individual study taken at the last semester of the senior year. Students are required to solve a large-scale problem by designing a new system or developing a comprehensive solution to improve the current system. The new design or solution for improvement must take into account realistic constraints such as economic, social and environmental conditions.

⁵⁸ When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<i>Course learning outcomes</i>	Upon the successful completion of this course students will be able to:		
	Competency level	Course learning outcome (CLO)	
	Knowledge	CLO1. Know how to study a system. Know how to identify a specific problem that related to the economic, social and environmental consideration.	
	Skill	CLO2. Apply engineering methods and holistic and systematic approaches to formulate and solve practical problem. Be able to conduct literature review related to the specific topic, collect sources information and analyze parameters, evaluate, choose, and apply adequate methods of modeling, simulation, design and implementation of technical and economic systems. Be able to design a new system or develop a solution to improve the current system in a large scale, subject to complicated and realistic constraints (economic, social and environmental) and conduct experiments and analyze the solutions using optimization tools and advanced knowledge of natural sciences, mathematics and engineering.	
Attitude	CLO3. No cheating, regular meetings, on-time reports. Develop soft and professional skills (communication, decision making, organize, plan, and manage the projects) and apply ethical practices to handle issues in the working environment. Be able to report and defend their research in both writing and speaking format.		
<i>Content</i>	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>		
	Weight: lecture session (3 hours)		
	Teaching levels: I (Introduce); T (Teach); U (Utilize)		
	Topic	Weight	Level
	Identify the problem, objectives, scope and limitation	1 hr	I, U
	Conduct literature review and study related theory	4 hrs	I, U
	Develop the system to figure out the solution for the studied problem	3 hrs	U
	Propose research plan and Proposal defense	1 hr	U
	Investigate the current system by identifying all of its inputs, outputs and realistic constraints, including economics, social and environmental to determine areas for improvement	12 hrs	U
	Design a new system or develop improvement solution to improve the system in a large scale with those complicated and realistic constraints.	12 hrs	U
Implement the current and improvement systems	6 hrs	U	
Data collection and validate the proposed solutions	3 hrs	U	
Write a final report and make presentation.	3 hrs	U	

<i>Examination forms</i>	Presentation, Report.
<i>Study and examination requirements</i>	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/ Examination: Students must have more than 50/100 points overall to pass this course.
<i>Reading list</i>	<i>Textbooks and Lecture Notes of related courses, scientific articles in research databases such as sciencedirect, Ieeexplore, Springer, etc.</i>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-...) and Intended Learning Outcomes (ILO) (1-3) is shown in the following table:

CLO	PLO/SLO						
	1	2	3	4	5	6	7
1	x			x			
2	x	x				x	x
3			x	x	x		

Intended Learning Outcomes (ILO)

Criteria for Accrediting Engineering Programs, 2020-2021

- an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
- an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*
- an ability to communicate effectively with a range of audiences*
- an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*
- an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
- an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*
- The relationship between Course Learning Outcomes (CLO) (1-3) and ASIIN learning outcomes is shown in the following table:

CLO	ASIIN learning outcomes								
	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6
1	1.1b	1.2a, 1.2b	1.3c, 1.3d	2.1a, 2.1b	2.2a			2.5b	
2	1.1a, 1.1b, 1.1c	1.2a, 1.2b	1.3c, 1.3d	2.1a, 2.1b	2.2a, 2.2b	2.3a	2.4c		
3	1.1b, 1.1c		1.3a 1.3b 1.3c					2.5b	2.6a 2.6b

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Identify the thesis problem: problem statement, objectives of study, scope and limitations	1	Report	Lecture advices Self-study and research	Internship 2 case study
2	Conduct current system process and literature review	1	Report	Lecture advices Self-study and research	Scientific databases
3	Identify research gap and proposed the solution system	1,2,7	Report	Lecture advices Self-study and research	
4	Propose research plan and Proposal defense	1	Report	Lecture advices Self-study and research	
5	Investigate the current system by identifying all of its inputs, outputs and realistic constraints, including economics, social and environmental to determine areas for improvement	1,4	Report	Lecture advices Self-study and research	
6	Design a new system or develop improvement solution to improve the system in a large scale with those complicated and realistic constraints.	1,2,7	Report	Lecture advices Self-study and research	
7	Midway report		Midway report		
8	Implement the current and improvement systems	1, 2,7	Report	Lecture advices Self-study and research	
9	Data collection and validate the proposed solutions	6	Report	Lecture advices Self-study and research	
10	Final report and defense		Final Report		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO4	CLO6	CLO7
Midway Report (20%)	Midway Report 60% Pass	Midway Report 60% Pass	60% Pass	0% Pass	60% Pass
Final Report (80%)	Final Report 60% Pass	Final Report 60% Pass	60% Pass	60% Pass	60% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist			
Student:	Topic:		
Date:	Evaluator:		
	Max.	Score	Comments
Chapter 1: Introduction (10%)			
Criterion 1: Problem statement	5		
Criterion 2: Objectives of Study	2		

Criterion 3: Scope and Limitations	3		
Chapter 2: Literature Review (10%)			
Criterion 1: Current System	2		
Criterion 2: Related Works	5		
Criterion 3: Research Gap(s) and Key Ref.	3		
Chapter 3: Proposed System (20%)			
Criterion 1: Methodology Selection	10		
Criterion 2: Proposed Solution	10		
Chapter 4: Current System (15%)			
Criterion 1: Current Implementation	10		
Criterion 2: Areas for improvement	5		
Chapter 5: Improvement System (20%)			
Criterion 1: Proposed Improvement Solution	10		
Criterion 2: Implementation for Improvement Solution	10		
Chapter 6: Data Collection and Validation (20%)			
Criterion 1: Data Collection and Processing	5		
Criterion 2: Solution Validation	15		
Chapter 7: Report and Presentation (5%)			
Criterion 1: Report	2		
Criterion 2: Presentation	3		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	Description
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: 10/5/2022

Ho Chi Minh City, 10/05/2022
**Dean of School of Industrial Engineering
and Management**

(Signature)



Dr. Nguyen Van Hop