VIETNAM NATIONAL UNIVERSITY – HO CHI MINH CITY
INTERNATIONAL UNIVERSITY
School of Electrical Engineering

PROGRAM SPECIFICATION

PROGRAM LEVEL

ENGINEER IN ELECTRONICS - TELECOMMUNICATIONS ENGINEERING

June, 2024

Contents

PREFACE

The School of Electrical Engineering (SEE) was established in 2004 by the decision of the International University (IU) – Vietnam National University Ho Chi Minh City (VNU HCMC), and the Electronics - Telecommunications Engineering (ET) program had the first recruitment in 2005. The major fields of the SEE consist of Electronics Engineering, Communication Engineering, and Signal Processing.

Since the establishment of SEE, there are some milestones as follows:

- In 2009: ET program had the first graduates
- In 2010: SEE set up Master Program in Electrical Engineering
- In 2013: ET program was accredited by AUN-DAAD
- In 2013: SEE set up a modern laboratory, RF and Microwave Laboratory
- In 2014: SEE set up Program in Automation and Control Engineering
- In 2015: SEE set up a new laboratory, Micro-Processing and Embedded System Laboratory
- In 2016: SEE set up a new laboratory, PLC and SCADA
- In 2017: SEE set up a new laboratory, Signal Processing
- Since Oct 1, 2017 - present: Accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org, under the commission's General Criteria and Program Criteria for the Electronics - Telecommunications Engineering Program.
- In 2023: SEE set up a new laboratory, Robotics
- In 2023: Control Engineering and Automation Program was accredited by ASIIN

The SEE is rapidly growing in recent years. To meet the vision of the university, we have strived to become a high quality and research-oriented school. Our school provides the students with a dynamic learning environment and the opportunity to collaborate with on-going research projects. Our current projects include Forest Fire Detection and Monitoring System, Environmental Monitoring and Sampling System, Object Detection and Localization, or Microwave Applicator with Conveyor Belt System. More details can be found on the SEE's website: *https://see.hcmiu.edu.vn*

PROGRAM SPECIFICATION

1. INTRODUCTION

a) Vision

It is aimed to become the school with national and international recognition in advanced teaching methodology, State-of-the-Art research, and innovation.

- *Advanced teaching methodology*
  - ✔ To provide students fundamental and advanced theories and link them to engineering application
  - ✔ To interact with students both inside and outside classrooms
  - ✔ To support students with blended teaching
  - ✔ To inspire students to engage research and solve technical problems
- *State-of-the-art research*
  - ✔ To build the modern laboratories involved in research areas of the school and foster students to join
  - ✔ To prepare the academic curriculum involved in research
- *Innovation*
  - ✔ To guide students to comprehend the social, economic, and technical contexts
  - ✔ To direct students to recognize current and future problems
  - ✔ To teach students the creation and critical thinking
  - ✔ To foster students to work in teams for integrated problems

b) Mission

Being consistent with the mission of the IU – VNU HCMC, SEE aims to:

- help students to take the best advantage of their educational opportunities and prepare them with the necessary knowledge to be able to adapt to the rapid change in technology
- conduct high-quality research that benefits students, scholar and communities
- transfer technology to solve community problems and create strong collaboration with the industry.

c) Objectives

SEE developed its Program Educational Objectives (PEOs) and posted on the school website at https://see.hcmiu.edu.vn. The SEE educates graduates with highly specialized knowledge and skills to:

(1) Be a capable engineer who may contribute in different areas of Electrical and Electronic industries

(2) Be engaged in lifelong learning and researching to adapt rapid changes in global economic and technologies

(3) Serve efficiently the community, society, and industry in an ethical and responsible manner

(4) Have professional working style and leadership

d) Program

- Language: English
- Types of program: the program requires students to spend 4.5 years of study at IU and offers students with a degree awarded by IU-VNU once completing the program (IU program)

e) Qualification

- The Degree of Engineer is awarded by International University (IU) – Vietnam National University Ho Chi Minh City (VNU-HCMC)
- Degree title: "Engineer in Electronics - Telecommunications Engineering"

2. PROGRAM LEARNING OUTCOMES

The School of Electrical Engineering, International University, Vietnam National University HCMC uses the Student Outcomes (SOs) from 1 to 7 based on ABET SOs (the version from 2020). The SOs are also published at the school website (https://see.hcmiu.edu.vn/en/students/student-outcomes-abet/), student's handbook, and all course syllabi.

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.

3. THE PROGRAM OBJECTIVES

3.1. Consistency of the Program Educational Objectives (PEOs) with the mission of the Institution

The PEOs correlate well with the university mission. The PEOs #1 and #3 supports graduates for knowledge and needed skills used to contribute to the development and industrialization of Vietnam. The PEOs #2 and #3 allow the graduates to continue and update their knowledge and necessary skills to carry out research for serving society and industry in ethical and responsible manner. The PEO #4 helps graduate achieve professional working style and leadership. Table 3-1 shows the consistency of the PEOs with the mission of the institution.

Table 3-1: The Consistency of the PEOs with the Mission of the Institution

University Mission	PEO 1	PEO 2	PEO 3	PEO 4
To become an international higher education institution with a Vietnamese cultural identity	x		x	x
To pioneer in adopting an advanced and autonomous higher education governance model			x	x
To offer higher education programs in a wide range of areas, all accredited by regional and international accreditation organizations	x	x	x	
To enhance internationalization by using English as the medium of instruction. Students are trained to become global citizens with a high self-awareness of their social responsibility for a long-term, sustainable development		x		x

To pursue excellence in basic and applied research in order to meet the demand for innovative and sustainable development of industries, provinces and regions; to promote connectedness by means of collaboration activities and social services	x	x		

The SEE mission is also connected with the PEOs such as "to educate graduates who are instructed deeply and broadly in specialized techniques and social responsibility in the context of the rapid global development of technology."

3.2. Program Constituencies

The PEOs of the Electrical Engineering program are decided and judged with a careful consultation of four core constituents: Students, Alumni, Industry, and Faculty. The process of design, determination, and evaluation of PEOs through the constituents will reflect the needs of constituents.

a) Students

The needs of student are collected through the regular meeting (twice per semester) between advisors and students, annual welcome meeting between faculty and students, annual exit surveys with graduating students, irregular meeting between students and Board of Dean, and student evaluation at every semester.

b) Alumni

Alumni feedback is surveyed through the survey form, discussions with alumni representatives from the school alumni list. The surveys are also carried out with current graduate students who have a Bachelor degree from IU – VNU HCMC.

c) Faculty

Faculty inputs are obtained through bi-monthly school meetings, weekly extended Board of Dean meetings, bi-annually course evaluation of faculty. If the faculty recommends revising the PEOs, the proposals suggested by the faculty will be sent to other stakeholders for discussion. Finally, the PEOs will be voted by the faculty.

d) Industry

School Advisory Council (SAC) was established in order to advise the PEOs quality of education and academic curriculum. Representatives from industry are also the members of the board. The academic board meeting is organized at the end of the academic year or by request, and the recommendation of the industrial representatives is considered as the input of industry.

Moreover, industry input is also obtained through employer surveys (via alumni surveys and employer surveys). The selective employers who were surveyed include Renesas Vietnam, Global Cybersoft, Jabil Vietnam, Bosch Vietnam, Arrive Technology Vietnam, FPT Software Vietnam, Intel, Verification, and Certification Center 2, Samsung Vietnam, ABB, etc.

4. JOB OPPORTUNITIES

- Develop a new generation of infrastructure and equipment of IoT.
- Design and connect mobile devices in automobiles, buildings and other electronic products.
- Research and develop renewable energy resources.
- Hardware design and products development, civil electronics.
- Work opportunities for domestic and international cooperations in telecommunications, information and mobile networks, airport and transportation companies…

5. PROGRAM OFFERING

a) Awarding institution: International University, VNU-HCMC

b) Teaching institution: School of Electrical Engineering

c) Accreditation:

Institutional level: MOET (2015), AUN (2018), ASIIN (2023)

Program level: AUN-DAAD (2013), ABET (2017)

d) Name of the final award:

e) Program Title: Engineer in Electronics - Telecommunications Engineering

f) Admission criteria of the program:

6. TEACHING AND LEARNING APPROACH

Lectures are delivered in an appropriate mix of assignments, seminars, labs or internships, projects, capstone design, and more.

Project-based instruction is used to effectively develop key skills while gaining curriculum content knowledge. The project's topics are related to current real-life issues, using advanced technical technology for daily life as well as industrial applications.

Projects, analysis and design work are carried out in the direction of cooperative learning, where students are grouped together to improve attention and mutual understanding. Each team member will have a specific role and to achieve a common goal, it is necessary to interact and work in sync.

The capstone design is for introduction to engineering design process. This course consists of two semesters of lecture and design. This course requires students to develop a project based on the knowledge and skills acquired in earlier coursework and integrate their technical knowledge through practical design effort. Students will work in multidisciplinary teams to complete an approved engineering design projects that is fully documented and prototyped. In the Capstone Design Project 1, students will learn to define a problem, conduct research to propose the solutions, determine the realistic constraints, prepare project scheduling, and create a planned budget for the project. Each team is comprised of two to four students. In addition, the Capstone Design Project 2, students will be assigned a faculty member to oversee the progress of the project. The student will follow the design process, under the guidance of the assigned faculty member, and to develop the prototype based on the proposed design specifications.

Internship is required before final thesis registration. This is an opportunity for students to learn in professional practice and their first approach to the industrial labor market. Students have to work at their chosen company for at least 08 weeks and are supervised by the company. Students can stay at university during internship if they prefer doing research. After completing the internship, most students have ideas for their final thesis and intention for future career.

The final thesis is required for graduation. It takes at least a year to finish and is divided into two sections: the senior project and thesis. In the senior project, students will form a research idea and review all related knowledge. Then, the idea will come up with solution by proved theory, software simulation or hardware implementation during the thesis. The requirements and scope of the project ensure that students work independently on a scientific and technical topic in the field of control and automation. Students will apply scientific methods and open approaches to the appropriate level of knowledge to achieve the original goal.

7. STUDENT ASSESSMENT

The curriculum of the EE undergraduate program was designed to give students a solid science and engineering foundation, with emphasis on scientific research, practical skills, and a multidisciplinary approach. The assessment methods covering those objectives include:

- Midterm exams, final exams, quizzes, and homework assignments, to assess the basic science and engineering knowledge.
- Lab performance evaluation, to assess practical skills.
- Project results to assess research skills and capability of working independently; and
- Internship, senior project, and thesis evaluations, which assess all of the above objectives.

7.1. Course Assessment

These assessments include midterm exams, final exams, labs, quizzes, homework assignments and project presentations, and are applied in each course. 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. The laboratory assessments require students to perform experiments and report on the experimental results.

The criteria to assess students' performance are clearly indicated in the syllabus distributed at the beginning of the course and posted on the course Blackboard. At the beginning of the course, the instructor informs students of assessment criteria for the student progress towards course outcomes.

The course grades are collected using the EduSoft software, which computes the Grade Point Average (GPA) and used for evaluating student's performance. There are two types of GPA:

- Semester GPA: is the weighted average grade of all the subjects the student registered during a particular semester. The semester GPA is used as a criterion for awarding scholarships.
- Cumulative GPA: is the weighted average grade of all the subjects that a student has registered for the whole period of his/her study. Cumulative GPA is used for evaluating a student's performance and graduation.

The assessment criteria for each course are based on the content of that course, to achieve the course outcomes. The course outcomes, in turn, are designed and improved upon by instructors of the course, to achieve the program outcomes. In other words, the criteria for course assessment reflect the course outcomes that in turn reflect the program outcomes.

7.2. Senior Project and Thesis Assessment

The senior project is the prerequisite to the thesis in order to provide students with essential research skills and knowledge for the completion of the thesis. During the senior project, they must achieve preliminary research results as well as literature backgrounds for assigned topics

before continuing with their thesis. The thesis is performed within one semester after completing the senior project.

For completing the senior project or thesis, the students are required to defend their works and obtain the committee's evaluation. Before presenting in front of the senior project or thesis examination committee, a student must obtain a favorable recommendation from his/her thesis advisor. If there are disagreements between them, the Dean of the School will be consulted to find a solution. If a student fails at the senior project or thesis presentation, he/she must repeat the whole process. In any case, the duration of the entire study cannot exceed the permitted time, which is six years, determined by IU – VNU HCMC rules.

The criteria for assessing the course senior project and thesis are clearly stated in the evaluation form. The students must achieve the average grade of at least 50/100 from the committee in order to pass the senior project or thesis examinations. Besides the faculty members of the School, the members of the thesis committee may include the faculty members from other IU – VNU HCMC units and other universities.

7.3. Internship Assessment

Each student is supervised by one advisor from the intern organization. At the end of the internship, they submit their reports and present what they have learned from the companies and institutions.

The committee assigned by SEE evaluates the student's performance. The average grade of committee members is the final grade of the internship.

7.4. Exit Assessment

For graduation, students are required to complete the entire curriculum, obtain a TOEFL score of 550 or equivalents, and accomplish the military training duty. Every semester, the Office of Academic Affairs (OAA) prepares a list of potential candidates for graduation which is reviewed by the School. The university committee discusses and gives its approval.

7.5. Grading

Students' overall performance throughout the semester is formally monitored through course grades which are at least 50 (maximum score of 100) to pass each course (see Table 7-1).

Table 7-1: Grading Criteria

Grade Level	100 Point Grading Scale	Grading Scale in Letters	4-Point Grading Scale
Excellent	$90 \leq GPA \leq 100$	A+	4.0
Very Good	$80 \leq GPA < 90$	A	3.5
Good	$70 \leq GPA < 80$	B+	3.0
Average Good	$60 \leq GPA < 70$	B	2.5
Ordinary	$50 \leq GPA < 60$	C	2

According to the regulations of IU, the weightings for calculating course grades are as follows:

- Midterm exam: 20%-30%
- Final exam: 60%-40%
- Others (quizzes, homework assignments, projects, etc.): 20%-30%

The weightings for the final grade of a laboratory course are:

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

If a student is not satisfied with the scores, he/she can ask for a re-assessment.

If the performance of a student does not meet the minimum requirements, the academic advisor will first discuss with the student and his/her peer advisor to understand the situation and give advice to the student. If the situation is not improved in the following semester, the advisor will bring the case to the School/Department who will decide the actions to be taken.

8. PROGRAM STRUCTURE

The Engineer in Electronics - Telecommunications Engineering program is the credit-based system which is conducted on a semester basis. In addition, the curriculum also consists of extra activities such as Military Training, Physical Training and extra courses such as English, Political Educations. Those extra-curricular trainings and Political Education courses are built and implemented in accordance with MOET regulations. The English courses are also given with different levels in order to assure the student's English language proficiency. Students are required to complete at least 152 credits (including thesis) and take an English proficient examination to

accomplish the program. The English proficiency for graduation is TOEFL iBT score of 61, IELTS score of 5.5 or overall equivalent qualification. In particular, the courses in ET program can be classified into the following portions:

- 31 credits in General Education (GE), which includes:
  - 11 credits in political education
  - 09 credits in social science
  - 08 credits in English proficiency
  - 03 credits in elective subject
- 35 credits in Mathematics and Science (M&S), which includes
  - 21 credits in mathematics (Calculus, Differential Equations, and Probability)
  - 10 credits in Physics
  - 04 credits in Chemistry
- 86 credits in Electrical Engineering, which includes
  - 16 credits in Engineering design (capstone design, senior project and thesis)
  - 49 credits in required ET courses
  - 18 credits in ET elective courses
  - 03 credits in Internship

8.1. General Education Area of Electrical Engineering Program

The 31 credits of general consist of 4 groups and are described in Table 8-1.

Table 8-1: Requirements for GE Courses

Description	Credits	Percentage
Group 1 - Political Education - PE015IU - Philosophy of Marxism and Leninism - PE016IU - Political economics of Marxism and Leninism - PE017IU - Scientific socialism - PE018IU - History of Vietnamese Communist Party - PE019IU - Ho Chi Minh's Thoughts	11	35%

Group 2 - Extra courses (non-counting) - PT001IU - Physical Training 1 - PT002IU - Physical Training 2 - Military Training	0	0%
Group 3- English Proficiency - EN007IU - Writing AE1 - EN008IU - Listening AE1 - EN011IU - Writing AE 2 - EN012IU - Speaking AE2	8	26%
Group 4 - Social Science & General Elective - PE0022IU – Engineering Ethics Critical Thinking - EE114IU – Entrepreneurship - PE021IU – General Laws - General elective (*)	12	39%
Total (credits)	**31**	**100%**

The political education and extra courses take 35% of our GE component. They are obliged to be a standard part of all higher educational program defined by MOET. The 8 credits in Group 3 are mainly focused on academic listening and scientific writing skills. It was designed by IU to bridge the English gaps of Vietnamese students.

The total credits from Group 1, Group 2, and Group 3 which are equivalent to 19 credits in lower division courses help our program run legally in our national education system and helps our students boost their English level only. They can be considered as extra courses and will not be classified in the general education portion in order to cope with ABET's program criteria and to have a better comparison with another accredited program.

Group 4 provides students with the logical reasoning, how to start-up a business and a broader education listed in Table 8-2. These 12 credits weighted 39% of an overall general education program can be considered as usual general education courses.

Table 8-2: GE Courses

No.	ID	Course	Credit
1	BA003IU	Principles of Marketing	3
2	BA006IU	Business Communication	3
3	BA027IU	E-Commerce	3
4	BA098IU	Leadership	3
5	BA117IU	Introduction to Micro Economics	3
6	BA120IU	Business Computing Skills	3
7	ENEE1001IU	Engineering Drawing	3
8	ENEE2001IU	Introduction to Environmental Engineering	3
9	ENEE2008IU	Environmental Ecology	3
10	CE103IU+04	Computer-Aided Design and Drafting (CADD)+Practice CADD	4
11	CE211IU	Hydrogoly-Hydraulics	3
12	IT069IU	Object-Oriented Programming	3
13	BM030IU	Machine Design	3
14	IS085IU	CAD/CAM/CNC	3
15	IS019IU	Production Management	3
16	IS034IU	Product Design & Development	3
17	IS040IU	Management Information System	3
18	IS065IU	Supply Security and Risk Management	3
19	PH027IU	Earth observation and the environment	3
20	PH018IU	Introduction to Space Engineering	3
21	PH035IU	Introduction to Space Communications	3

22	PH036IU	Remote Sensing	3
23	PH037IU	Space Environment	3
24	PH040IU	Satellite Technology	3
25	EL017IU	Language and Culture	3
26	EL018IL	Cross-Cultural Communication	3
27	EL021IL	Global Englishes	3
28	EEAC014IU	Neuron Network and Fuzzy Logics	3

In summary, 19 credits of our GE program (from Group 1 to Group 3) were designed to bridge the gap between operation and English level. There are only 12 credits (Group 4) can be classified in GE area. Accordingly, the overall program's credits are reduced from 152 credits to 133 credits according to the above statement.

8.2. Mathematics and Basic Sciences of Electronics - Telecommunications Engineering Program

Our program is solidly built on 35 credits of mathematics and basic science in a lower division. The list of these fundamental courses is given in Table 8-3 in which mathematics has 60% of the overall credits of this program area. The Department of Mathematics provides all mathematics topics ranging from functional analysis, series, and complex number to the advanced one such as linear algebra, differential equation, and probability. The rest 40% of this program portion is physics and chemistry together with 2 lab courses which give our students an adequate basis of ET Engineering. The Department of Physics and the school of Biotechnology are responsible for providing the antecedent to all the Physics, Chemistry and the two laboratory courses. The mathematics and basic sciences exceed the minimum requirement for this program area.

Table 8-3: List of Mathematics and Basic Science Courses

Description	**Credits**	**Percentage**
Mathematics - MA001IU - Calculus 1 - MA003IU - Calculus 2 - MA023IU - Calculus 3 - MA027IU - Applied Linear Algebra	21	60%

- MA024IU - Differential Equations - MA026IU - Probability & Random Process		
Basic Sciences - PH013IU - Physics 1 (Mechanics) - PH014IU - Physics 2 (Thermodynamics) - PH015IU - Physics 3 (Electricity & Magnetism) - PH016IU - Physics 3 Lab - PH012IU - Physics 4 (Optics & Atomics) - CH011IU - Chemistry for Engineers - CH012IU - Chemistry for Engineers Lab	14	40%
Total (credits)	**35**	**100%**

8.3. Electronics - Telecommunications Engineering Program

The Engineering specialization requires students to spend more than one year on engineering sciences and another year and a half on engineering designs. This is defined in our core major requirements, specialization major requirements and professional practice and research as shown in Table 8-4.

Table 8-4: Distribution of Engineering Science and Engineering Design Courses

Description	**Credits**	**Percentage**
Engineering Sciences - Core major requirement	**33**	**38%**
- Introduction to Electrical Engineering - Introduction to Computer for Engineers - Programming for Engineers + Lab - Principles of EE1 + Lab - Principles of EE2 + Lab - Digital Logic Design + Lab - Electromagnetic Theory - Electronic Devices + Lab - Signals and Systems + Lab		
Engineering Design	**53**	**62%**
Engineering Design - Specialization Requirement	34	40%

- Power Electronics + Lab - Microprocessing Systems + Lab - Digital Signal Processing + Lab - Principles of Communication Systems + Lab - ***5 ET elective courses (**)***		
Engineering Design – Professional Practice and Research	19	22%
- Capstone Design 1 - Capstone Design 2 - Summer Internship - Senior project - Thesis		
Total	**86**	**100%**

According to Table 8-4, the engineering courses account for 86 credits over 133 total credits. It accounts for 65% of the whole educational program and thus exceeds the two years and a half requirement for the engineering specifications.

Engineering sciences are considered as the core major requirements which provide the basic foundation to the electrical engineering program. These requirements include the career orientation for students as well as the introductions to electrical engineering. Students are trained with basic skills for the major such as programming, conducting experiments, forming and solving basic electrical problems.

Engineering design consists of specialization requirements and the professional practice and research. Once completed the engineering science portion, students will choose their specialization in electrical engineering. Currently, the program offers four major specializations, which are Electronics, Signal Processing, RF design, and Communications. Each specialization has both required and elective courses. The list of courses is given in Table 8-5.

Students complete their undergraduate studies with either internship program in a company (professional practice) or a research project conducted at the university.

Table 8-5: List of Elective Courses

No.	ID	Course	Credit

1	EE061IU EE062IU	Analog Electronics Analog Electronics Laboratory	3 1
2	EE094IU EE095IU	Digital Electronics Digital Electronics Laboratory	3 1
3	EE105IU EE124IU	Antenna and Microwave Engineering Antenna and Microwave Engineering Lab	3 1
4	EE075IU	Theory of Automatic Control	3
5	EEAC020IU	Theory of Automatic Control	4
6	EE063IU EE117IU	Digital System Design Digital System Design Lab	3 1
7	EE066IU EE121IU	VLSI Design VLSI Design Lab	3 1
8	EE104IU EE118IU	Embedded Real-time Systems Embedded Real-time Systems Lab	3 1
9	EE070IU EE116IU	Wireless Communications Systems Wireless Communications Systems Lab	3 1
10	EE119IU EE120IU	Telecommunication Networks Telecommunication Networks Lab	3 1
11	EE072IU	Computer and Communication Networks	3
12	EE102IU	Stochastic Signal Processing	3
13	EE103IU EE122IU	Image Processing Image Processing Lab	3 1
14	EE123IU	Special Topics in Electrical Engineering	2
15	EE074IU	Digital Signal Processing Design	3

16	EE125IU EE126IU	RF Circuit Design RF Circuit Design Lab	3 1
17	EEAC008IU	Sensors and Instrumentation	3
18	EE127IU	Machine learning and Artificial Intelligence	3
19	EE128IU	Internet of Things (IoT)	3
20	EE129IU	Internet of Things Lab (IoT Lab)	1
21	EE133IU	Emerging Engineering Technologies	3

9. CURRICULUM

Course (Department, Number, Title) List all courses in the program by term starting with the first term of the first year and ending with the last term of the final year	Indicate Whether Course is Required, Elective, or a Selective Elective by an R, an E or an SE[2]	*Curricular Area (Credit Hours)*				Last Two Terms the Course was Offered: Year and, Semester, or Quarter	Average Section Enrollment for the Last Two Terms, the Course was Offered[1]
		Math & Basic Sciences	Engineering Topics *Check if Contains Significant Design* (√)	General Education	Oth		
Semester 1							
MA001IU - Calculus 1	R	4				*Fall 2023, Spring 2024*	*779,330*
PH013IU - Physics 1 (Mechanics)	R	2				*Fall 2023, Spring 2024*	*668,396*
CH011IU - Chemistry for Engineers	R	3				*Fall 2023, Spring 2024*	*637,278*
CH012IU - Chemistry Lab	R	1				*Fall 2023, Spring 2024*	*453,271*
EN007IU - Writing AE1	R			*2*		*Fall 2023, Spring 2024*	*819,576*
EN008IU - Listening AE1	R			*2*		*Fall 2023, Spring 2024*	*815,575*
EE050IU - Intro to Computer for Engineers	R		*3*			*Fall 2023, Spring 2024*	*95,59*
PT001IU - Physical Training 1	R			*0*		*Fall 2023, Spring 2024*	*820,660*
Semester 2							
MA003IU - Calculus 2	R	4				*Fall 2023, Spring 2024*	*282,549*
MA027IU - Applied Linear Algebra	R	2				*Fall 2023, Spring 2024*	*311,117*
PH014IU - Physics 2	R	2				*Fall 2023, Spring 2024*	*611,358*

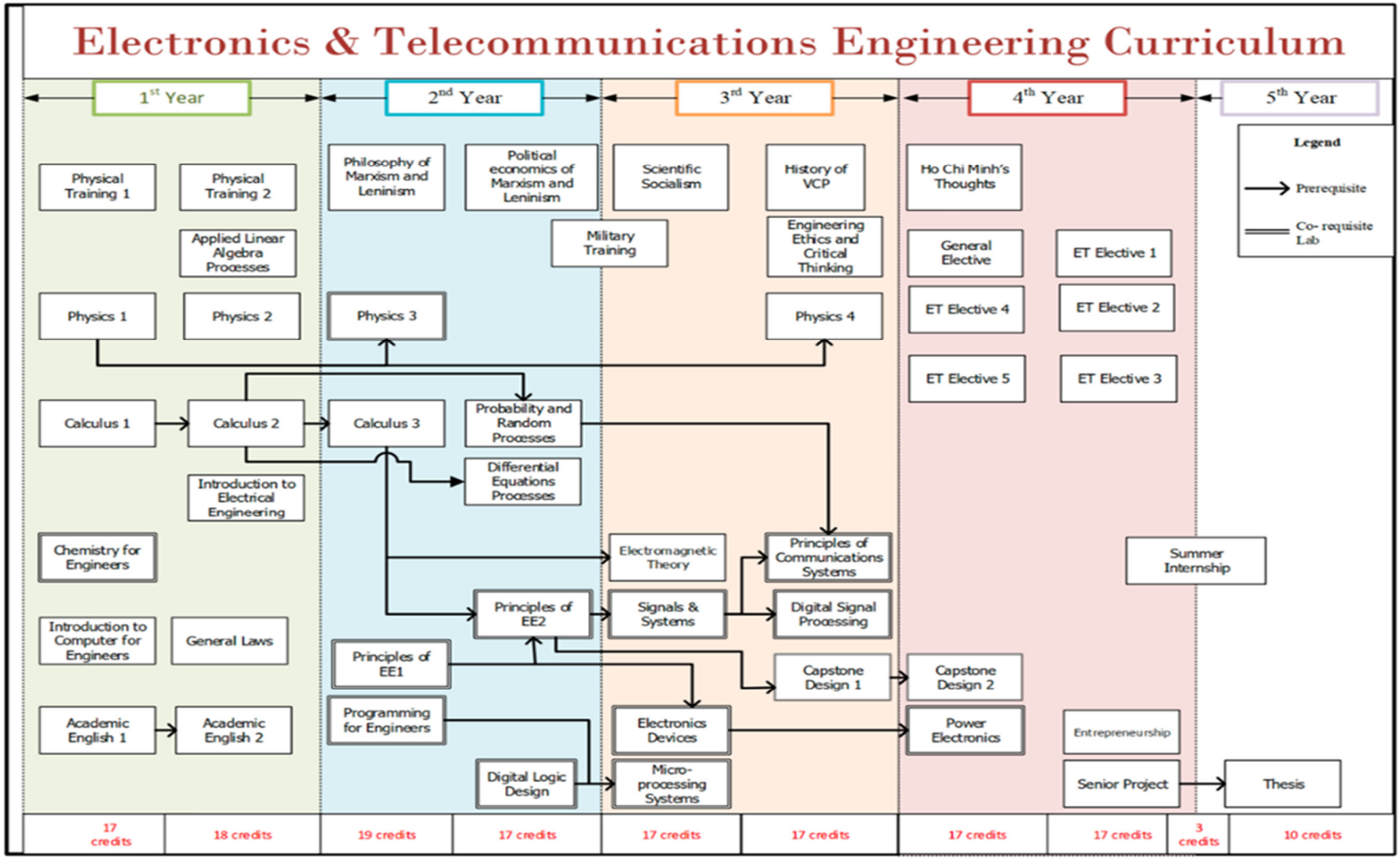
EN011IU - Writing AE 2	R			*2*		*Fall 2023, Spring 2024*	*528,775*
EN012IU - Speaking AE2	R			*2*		*Fall 2023, Spring 2024*	*457,778*
EE049IU - Introduction to EE	R		*3*(√)			*Fall 2023, Spring 2024*	*46,77*
PT002IU - Physical Training 2	R			*0*		*Fall 2023, Spring 2024*	*204,833*
PE021IU – General Laws	R			*3*		*Fall 2023, Spring 2024*	*36,143*
Semester 3							
MA023IU - Calculus 3	R	4				*Fall 2023, Spring 2024*	*236,387*
PH015IU - Physics 3	R	3				*Fall 2023, Spring 2024*	*249,396*
PH016IU - Physics 3 Lab	R	1				*Fall 2023, Spring 2024*	*109,138*
EE051IU - Principles of EE 1	R		*3*(√)			*Fall 2023, Spring 2024*	*166,96*
EE052IU - Principles of EE 1 Lab	R		*1*(√)			*Fall 2023, Spring 2024*	*106,57*
PE015IU - Philosophy of Marxism and Leninism	R			*3*		*Fall 2023, Spring 2024*	*803,615*
EE057IU - Programming for Engineers	R		*3*			*Fall 2023, Spring 2024*	*116,50*
EE058IU - Programming for Engineers Lab	R		*1*			*Fall 2023, Spring 2024*	*86,43*
Semester 4							
MA024IU - Differential Equations	R	4				*Fall 2023, Spring 2024*	*78,64*
MA026IU - Probability& Random Process	R	3				*Fall 2023, Spring 2024*	*240,188*
EE055IU - Principles of EE 2	R		*3*(√)			*Fall 2023, Spring 2024*	*33,69*
EE056IU - Principles of EE 2 Lab	R		*1*(√)			*Fall 2023, Spring 2024*	*26,67*

EE053IU - Digital Logic Design	R		*3*(√)			*Fall 2023, Spring 2024*	*99,50*
EE054IU - Digital Logic Design Lab	R		*1*(√)			*Fall 2023, Spring 2024*	*75,45*
PE016IU - Political economics of Marxism and Leninism				*2*		*Fall 2023, Spring 2024*	*670,728*
Semester 5							
EE088IU - Signals & Systems	R		*3*			*Fall 2023, Spring 2024*	*49,42*
EE089IU - Signals & Systems Lab	R		*1*			*Fall 2023, Spring 2024*	*50,39*
EE083IU - Microprocessor Systems	R		*3*(√)			*Fall 2023, Spring 2024*	*43,43*
EE084IU - Microprocessor Systems Lab	R		*1*(√)			*Fall 2023, Spring 2024*	*36,43*
EE010IU - Electromagnetic Theory	R		*3*			*Fall 2023, Spring 2024*	*43,80*
PE017IU - Scientific socialism	R			*2*		*Fall 2023, Spring 2024*	*700,507*
EE090IU - Electronics Devices	R		*3*			*Fall 2023, Spring 2024*	*42,70*
EE091IU - Electronics Devices Lab	R		*1*			*Fall 2023, Spring 2024*	*28,65*
Semester 6							
EE092IU - DSP	R		*3*			*Fall 2023, Spring 2024*	*31,50*
EE093IU - DSP Lab	R		*1*			*Fall 2023, Spring 2024*	*17,43*
EE068IU - Principles of Communication Systems	R		*3*(√)			*Fall 2023, Spring 2029*	*12,10*
EE115IU - Principles of Communication Systems Lab	R		*1*(√)			*Fall 2023, Spring 2023*	*11,9*
EE130IU – Capstone Design 1	R		*2(√)*			*Fall 2023, Spring 2024*	*46,23*

PE012IU – Physics 4	R	2				*Fall 2023, Spring 2024*	*127,223*
PE022IU – Engineering Ethics and Critical Thinking (***)	R			*3*			
PE018IU - History of Vietnamese Communist Party	R			*2*		*Fall 2023, Spring 2024*	*482,664*
Semester 7							
EE131IU - Capstone Design 2	R		*2*(√)			*Fall 2023, Spring 2024*	*13,45*
EE127IU – Machine Learning and Artificial Intelligence (**)	E		*3*			*Fall 2022, Fall 2023*	*16,25*
EE079IU – Power Electronics	R		*3*(√)			*Fall 2022, Fall 2023*	*19,25*
EEAC003IU – Power Electronics Lab	R		*1*(√)			*Fall 2022, Fall 2023*	*19,23*
XX---IU – General Elective(*)	E			*3*			
PE019IU – Ho Chi Minh's Thoughts	R			*2*		*Fall 2023, Spring 2024*	*530,775*
EE133IU – Emerging Engineering Technologies (**)	E		*3*			*Fall 2023, Spring 2024*	*20,16*
Semester 8							
EE107IU - Senior Project	R		*2*(√)			*Fall 2023, Spring 2024*	*28,21*
EE063IU – Digital System Design(**)	E		*3*			*Fall 2022, Fall 2023*	*12,9*
EE117IU – Digital System Design Lab(**)	E		*1*			*Fall 2022, Fall 2023*	*11,10*
EE104IU – Embedded Real-time System (**)	E		*3*			*Spring 2023, Spring 2024*	*27,19*
EE118IU – Embedded Real-time System Lab (**)	E		*1*			*Spring 2023, Spring 2024*	*27,17*
EE103IU – Image Processing (**)	E		*3*			*Fall 2022, Fall 2023*	*14,10*

EE122IU – Image Processing Lab (**)	E		*1*			*Fall 2022, Fall 2023*	*14,12*
EE114IU - Entrepreneurship	R			*3*		*Fall 2023, Spring 2024*	*49,49*
EE112IU - Summer Internship	R		*3*(√)			*Spring 2022, Spring 2023*	*93,40*
Semester 9							
EE097IU - Thesis	R		*10*(√)			*Fall 2023, Spring 2024*	*15,24*
OVERALL TOTAL CREDITS FOR THE DEGREE		***35***	***86***	***31***			
PERCENT OF TOTAL		***23%***	***57%***	***20%***			

10. CURRICULUM MAPPING



11. RELATION OF PROGRAM ELOS AND COURSES

Table 11-1 describes the contribution of the courses of ET program in SOs attainment. Each course defines its CLOs that it must achieve. These course outcomes are described in the syllabus of each course and have a substantial relation to SOs, and the whole ET program addresses all SOs from 1 to 7. Besides, in order to ensure the students can achieve SOs, the ET program has the prerequisite structure which helps students prepare the necessary background knowledge to study more efficiently. This structure has been set at the initial design of the program in 2004 and revised by the academic board in case of any change.

Table 11-1: Attainment of Courses to SOs

	1	2	3	4	5	6	7
Political Education			x				
Social Science			x				
English Proficiency			x				
Mathematics	x						
Physics	x	x					
Chemistry	x	x					
EE049IU - Introduction to EE			x		x	x	x
EE050IU - Introduction to Computer for Engineers	x					x	
EE051IU - Principles of EE 1	x	x			x		
EE052IU - Principles of EE 1 Lab	x			x	x	x	
EE053IU - Digital Logic Design	x	x					x
EE054IU - Digital Logic Design Lab	x			x	x	x	
EE057IU - Programming for Engineers	x	x		x	x	x	
EE058IU - Programming for Engineers Lab	x	x		x	x		x
EE010IU - Electromagnetic Theory	x					x	x
EE055IU - Principles of EE 2	x		x	x		x	x
EE056IU - Principles of EE 2 Lab	x			x	x	x	
EE090IU - Electronics Devices	x	x			x		
EE091IU - Electronics Devices Lab	x				x	x	x
EE088IU - Signals & Systems	x			x		x	x
EE089IU - Signals & Systems Lab				x		x	
EE083IU - Micro-processing Systems	x	x				x	
EE084IU - Micro-processing Systems Lab		x		x			x
EE079IU – Power Electronics	x	x					
EEAC003IU - Power Electronics Lab	x				x		
EE092IU - DSP	x	x		x			
EE093IU - DSP Lab					x	x	

EE068IU - Principles of Communication Systems	x			x			x
EE115IU - Principles of Communication Systems Lab	x	x		x		x	
EE114IU - Entrepreneurship		x	x	x	x		
EE130IU – Capstone Design 1	x	x	x	x	x	x	
EE131IU – Capstone Design 2		x	x	x	x	x	x
EE107IU - Senior Project	x	x	x	x		x	x
EE097IU - Thesis	x	x	x	x		x	x
ET Electives (5 courses)							

COURSE SPECIFICATION

Electromagnetic Theory

1. Course Number and Name

EE010IU – Electromagnetic Theory

2. Credit and contact hours

3 credits, Three periods (45minutes per period), once per week

3. Instructor's or course coordinator's name

Dr. Pham Trung Kien

4. Textbooks and Other Required Materials

Elements of Engineering Electromagnetics", Sixth edition, by N. N. Rao, Prentice-Hall, 2004.

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course is designed to serve as the first course in electromagnetic to fulfill the requirements of the electrical engineering core curriculum. The content consists of vector calculus and field concepts such as EM fields in free space and in materials, Maxwell's equations, potential functions, energy storage, static and quasi-static fields. Transmission line theory is also introduced in this course.

b. Prerequisites or co-requisites

Prerequisite: MA023 – Calculus 3

Co-requisite: None

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Understand deeply Maxwell's equations and vector fields.
2. Use the knowledge of the propagation of the plane wave in free space and medium.
3. Analyze and compute the transient of the transmission line

b. The relationship between Course Outcomes (1-3) and Student Outcomes (1-5) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						
Course Outcome No.2	x					x	
Course Outcome No.3	x						x
Total(%)	40					30	30
ABET Evidences	3 Finals					3 Midterms	3 HW 3 Quizzes

7. Brief list of topics to be covered

- Vector algebra and coordinate systems
- Electric and magnetic fields
- Faraday and Ampère's laws
- Gauss' laws and law of conservation of charge
- Maxwell's equations in differential form
- Uniform plane waves in free space and polarization of sinusoidally time-varying fields
- Fields and Waves in Material Media
- Boundary conditions
- Gradient, Laplacian, and the Potential Functions
- Transmission Line
- Review/Questions & Answers

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: ptkien@hcmiu.edu.vn

8. Independent Learning Experiences:

Homework problems are assigned bi-weekly collected and graded.

9. Course Policies:

Assignments: All assignments need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Dr. Pham Trung Kien

Introduction to Electrical Engineering

1. Course Number and Name

EE049 – Introduction to Electrical Engineering

2. Credit and contact hours

3 credits, Four periods (45minutes per period), once per week

3. Instructor's or course coordinator's name

Dr. Ta Quang Hien

4. Textbooks and Other Required Materials

Will be provided

Other supplemental materials:

None

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course is an introduction to engineering processes for future electrical engineering. This course provides the students with the fundamental concepts of the electrical engineering profession. In addition, the students will learn the proper usage of engineering tools, including computers and measurement equipments. Students will also perform statistical analysis of experimental data, define engineering requirements, and implement simulation. Self-learned online courses: introduction to internet of things.

b. Prerequisites or co-requisites

Prerequisite: None

Co-requisite: None

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Have an understanding of electrical engineering profession and disciplines.
2. Have a basic understanding of engineering methods, including experimentation, data analysis, and computer skills
3. Have an introduction to engineering process, defining requirements, and implementing projects.
4. Have an opportunity to practice communication skill and collaboration skill with teammates.
5. Have ability to engage life-long learning.

b. The relationship between Course Outcomes (1-5) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1					x		
Course Outcome No.2						x	x

Course Outcome No.3					x		
Course Outcome No.4		x					
Course Outcome No.5							x
Total(%)		20			30	20	30
ABET Evidences		3 Group project reports			3 Group project reports	3 Midterms 3 Finals	3 HW 3 Quizzes

7. Brief list of topics to be covered

- Electrical Engineering Overview
- Engineering Design Process
- Case studies to understand the professional and ethical responsibility as an engineer
- Project planning and schedule with team
- Introduction to a general communication system
- Data Analysis techniques
- Basic circuit design and analysis
- Introduction to Programming
- Programming applied into data analysis
- Basic computer architecture
- Engineering applications
- Presentation and communication for engineering
- Self-learned online courses: introduction to internet of things

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: tqhien@hcmiu.edu.vn

8. Independent Learning Experiences:

Homework problems are assigned bi-weekly collected and graded.

9. Course Policies:

Assignments: All assignments need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Dr. Ta Quang Hien.

Introduction to Computer for Engineers

1. Course Number and Name

EE050IU – Introduction to Computer for Engineers

2. Credit and contact hours

3 credits, four periods (45minutes per period), once per week

3. Instructor's or course coordinator's name

Dr. Vo Tan Phuoc

4. Textbooks and Other Required Materials

MATLAB Programming for Engineers, Stephen J. Chapman, Thompson Books

Lecture Notes

Other supplemental materials

None

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course is an introduction to solving engineering problems through the use of the computer. It introduces general problem-solving techniques including the concepts of step-wise refinement applied to the development of algorithms. This course will cover elementary programming concepts using the MATLAB programming language and apply those concepts towards the solution of engineering problems.

b. Prerequisites or co-requisites

Prerequisite: None

Co-requisite: None

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Understand the basic programming using MATLAB.
2. Understand the fundamentals of data types and storage classes in MATLAB.
3. Understand the conditional program execution, program loops, and iteration.
4. Design, implement & debug a program that uses MATLAB programming constructs.
5. Apply numerical approximations to calculating integrals, curve fitting and ODE.

b. The relationship between Course Outcomes (1-5) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						
Course Outcome No.2	x						
Course Outcome No.3	x						
Course Outcome No.4	x						

Course Outcome No.5						x	
Total(%)	80					20	
ABET Evidences	3 HW 3 Quizzes					3 Midterms 3 Finals	

Course grades:

Homework Problem and Quizzes (30%)

Mid-term exam (30%)

Final Exam (40%)

7. Brief list of topics to be covered

- Introduction to computing and engineering & Basic function of MATLAB
- Matrices and Vectors
- File and cell arrays - Mathematical operation with arrays
- Plot and graphs - Script and function
- Logical operators and conditional statements
- Loop and strings
- Graphical User Interface (GUI) & Image Processing
- Numerical Integration
- Numerical Interpolation
- Curve fitting
- ODE
- Review

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: vtphuoc@hcmiu.edu.vn

8. Independent Learning Experiences:

Quizzes are given randomly, collected and graded.

9. Course Policies:

Assignments: All assignments need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Dr. Vo Tan Phuoc

Principles of Electrical Engineering I

1. Course Number and Name

EE051IU – Principles of Electrical Engineering I

2. Credit and contact hours

Credit hours: 3

3. Instructor's or course coordinator's name

Dr. Linh Mai

4. Textbooks and Other Required Materials

J. W. Nilsson and S. A. Riedel, Electric Circuits, 9th Ed, PEARSON, 2011.

Class notes.

Reference:

1. R. C. Dorf and J. A. Svoboda, Introduction to Electric Circuits, 9th Ed, John Wiley & Sons, 2014.

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course covers the following topics: Circuit elements; Independent sources; Dependent sources; Circuit analysis in DC and AC steady state; Operational amplifiers; Power Computations; Two-port circuits; Balanced three-phase circuits. Special seminar(s)

b. Prerequisites or co-requisites

Prerequisite: MA001IU – Calculus 1

Co-requisite: EE052IU – Principle of Electrical Engineering I Laboratory.

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Understand knowledge of Mathematics, Science, and Engineering for solving electrical engineering circuit.

2. Apply critical and analytic thinking to the principles of electrical engineering process.

3. Demonstrate creative thinking in the design of electrical engineering solutions.

4. Have ability to engage life-long learning and have an opportunity to participate in seminars to understand the impact of electrical engineering solutions in a global, economic, environmental and social context

b. The relationship between Course Outcomes (1-3) and Student Outcomes (1-5) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						

Course Outcome No.2		x			x		
Course Outcome No.3	x				x		
Course Outcome No.4	x	x					
Total(%)	40	30			30		
ABET Evidences	HW Quizzes Exam Project Presentation	Exam Project Presentation			HW Quizzes Exam Project Presentation		

Course grading policies:

Homework Problem, Class conduct, Seminars and Quizzes (30%)
Mid-term exam (30%)
Final Exam and Term-project (40%)

Note: Term-projects will be assigned after the Mid-term exam period

7. Brief list of topics to be covered

- Introduction to EE051IU: Circuit variables
- Simple resistive circuits
- Techniques of circuit analysis
- The operational amplifier
- Inductance, capacitance and mutual inductance
- Sinusoidal steady-state analysis
- Sinusoidal steady-state power calculations
- Two-port circuits.
- Balanced three-phase circuits: three-phase voltage sources, analysis of the wye-wye and wye-delta circuit, power calculation and measurements
-Term project presentation & Review

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: : mlinh@hcmiu.edu.vn or mlinh2009@gmail.com

8. Independent Learning Experiences:

Homework problems are assigned bi-weekly collected and graded.

9. Course Policies:

Assignments Students must use the official template of SEE to write their reports. All assignments need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Mai Linh

Principles of Electrical Engineering I Laboratory

1. Course Number and Name

EE052IU – Principles of Electrical Engineering I Laboratory

2. Credit and contact hours

Credit hours: 1, four periods (45 minutes per period), once per week

3. Instructor's or course coordinator's name

Nguyen Minh Thien, MEng.

4. Textbooks and Other Required Materials

Other supplemental materials:

Laboratory manuals supplied by the instructor

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course conducts a sequence of laboratory experiments to present and illustrate the operation of basic electronic circuits.

b. Prerequisites or co-requisites

Prerequisite: None

Co-requisite: EE051 – Principles of Electrical Engineering I

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course for both Automatic Control and Electrical Engineering undergraduates.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Operate electric equipment, multi-meters, power supplies, oscilloscopes and function generators; To study the behavior of some specified circuits.

2. Apply critical and analytic thinking to the principles of the electrical engineering process.

3. Demonstrate creative thinking in the design of electrical engineering solutions.

4. Have an opportunity to examine case studies to understand the professional and ethical responsibility as an engineer.

b. The relationship between Course Outcomes (1-5) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1						x	
Course Outcome No.2	x				x		
Course Outcome No.3				x			
Course Outcome No.4				x			
Total(%)	20			20	20	40	
ABET Evidences	3 Lab reports			3 Lab reports	3 Lab reports	3 Lab reports	

Total Evidence: 03 Lab reports.

Course grading policies:

- Presence in laboratory (10%)

- Laboratory experimental sessions (60%): including pre-lab report and laboratory experimental report.

- Final Exam (30%).

7. Brief list of topics to be covered

- Introduction to electric circuit laboratory
- Kirchhoff's current and voltage laws
- Frequency and phase shift measurement
- Thevenin's theorem for AC circuits
- Mesh and nodal analysis of AC circuits
- Operational Amplifiers
- Circuits utilizing op-amps

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: nmthien@hcmiu.edu.vn

8. Independent Learning Experiences:

- A pre-lab exercises are given before formal lab time. These exercises are required to be finished by each student and presented to the lab instructor.

- Lab reports are weekly collected and graded.

9. Course Policies:

Lab completeness: There are total 7 labs. Students must use the official template of SEE to write their reports. Students are required to complete all of questions given in lab procedure within time permitted for each lab, with the results shown to lab instructor.

Policy on dishonesty: Students are expected to do their own pre-lab exercises at all times. Any evidence of plagiarism or cheating will be treated as grounds for a penalty of 10% in the lab.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Nguyen Minh Thien

Digital Logic Design

1. Course Number and Name

EE053IU — Digital Logic Design

2. Credit and contact hours

Credit hours: 3

3. Instructor's or course coordinator's name

MEng. Do Ngoc Hung

4. Textbooks and Other Required Materials

R.J Tocci and N.S. Widner, *Digital Systems – Principles and Applications*, 10th Ed, Prentice Hall 2007.

Other supplemental materials:

[1] M.M. Mano and M.D. Ciletti, *Digital Design*, 4th Ed, Prentice Hall 2007

[2] J.F. Wakerly, *Digital Design: Principles & Practices*, 4th Ed., Prentice Hall, 2004

[3] Lecture notes

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course provides the students the basic design tools with combinational and sequential digital logic circuits and finite state machine. It covers the subjects on Binary arithmetic, Boolean algebra, K-maps, Combinational circuit synthesis, Combinational MSI circuits, Sequential logic circuit, Synchronous state machine design, and Sequential MSI circuits. Self-learned online courses : The Memory Hierarchy.

b. Prerequisites or co-requisites

Prerequisite: None

Co-requisite: EE054IU — Digital Logic Design Laboratory

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course for both Automatic Control and Electrical Engineering undergraduates.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

CO1. Understand the logical thinking and general concepts related to digital systems.

CO2. Apply some types of logic circuits.

CO3. Analyze sequential logic circuits based on state machine analysis.

CO4: Have ability to engage life-long learning.

b. The relationship between Course Outcomes (1-4) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						
Course Outcome No.2		x					

Course Outcome No.3		x					
Course Outcome No.4							x
Total(%)	60	30					10
ABET Evidences	3 Midterms 3 Finals	3 Written reports					3 Quizzes

7. Brief list of topics to be covered

- Introduction of Digital world and Number Systems.
- Basic math operations for digital systems and Binary codes, digital Arithmetic Operations.
- Binary Logic, Logic gates, and Boolean Algebra.
- Combinational Logic Circuits: Introduction and Design Fundamentals, K-map, and MSI Logic Circuit designs.
- Sequential Logic Circuits: Latches and Flip-Flop Devices, State Machines, Synchronous and Asynchronous Counters Designs, IC Counter and Register (Shift Register).
- Memory and Storage in the Computer.
- Self-learned online courses The Memory Hierarchy, MIT 6.004 L14 and 6.004 L15 courses

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: dnhung@hcmiu.edu.vn

8. Independent Learning Experiences:

Homework problems are assigned through two assignments or one mini project. The project is given at the start of the course while the assignment is given twice during the semester.

Students must study an online course to familiarize with the new technology about DLD field.

9. Course Policies:

Assignments/Projects: All assignments or projects need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment/project.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: MEng. Do Ngoc Hung.

Digital Logic Design Lab

1. Course Number and Name

EE054IU — Digital Logic Design Lab

2. Credit and contact hours

Credit hours: 1

3. Instructor's or course coordinator's name

MEng. Do Ngoc Hung

4. Textbooks and Other Required Materials

None

Other supplemental materials:

Handouts supplied by the instructor

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course conducts a sequence of laboratory experiments to present and illustrate theory of digital logic design involving Logic gates, Combinational logic circuit, MSI combinational logic circuit, Flip Flops and Counters, Counter ICs, and Shift register.

b. Prerequisites or co-requisites

Prerequisite: None

Co-requisite: EE053IU — Digital Logic Design

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course for both Automatic Control and Electrical Engineering undergraduates.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Apply theoretical knowledge to design particular applications of digital circuits.
2. Analyze the results and summarize them in a laboratory report.
3. Explaining the effect of the designed circuits to the output results.
4: Develop the teamwork skills in completing the tasks and writing reports.
5. Have an opportunity to exam case studies to understand the professional and ethical responsibility as an engineer.

b. The relationship between Course Outcomes (1-5) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						
Course Outcome No.2						x	
Course Outcome No.3						x	
Course Outcome No.4					x		
Course Outcome No.5				x			
Total(%)	20			20	20	40	

ABET Evidences	3 Lab reports			3 Lab reports	3 Lab reports	3 Lab reports	

7. Brief list of topics to be covered

- Logic gates and combinational logic
- MSI combinational logic
- Flip-Flops and Counters
- Counter ICs (part I)
- Counter ICs (part II)
- Shift Register
- Multiplexers
- Professional and ethical case studies

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: dnhung@hcmiu.edu.vn

8. Independent Learning Experiences:

A pre-lab exercises are given before formal lab time. These exercises are required to be finished by each student and presented to the lab instructor.

9. Course Policies:

Lab completeness: There are total 7 labs. Students must use the official template of SEE to write their reports. Students are required to complete all of questions given in lab procedure within time permitted for each lab, with the results shown to lab instructor.

Policy on dishonesty: Students are expected to do their own pre-lab exercises at all times. Any evidence of plagiarism or cheating will be treated as grounds for a penalty of 10% in the lab.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: MEng. Do Ngoc Hung.

Principles of Electrical Engineering II

1. Course Number and Name

EE055IU — Principles of Electrical Engineering II

2. Credit and contact hours

Credit hours: 3

3. Instructor's or course coordinator's name

Mr. Tran Van Su

4. Textbooks and Other Required Materials

- J. W. Nilsson and S. A. Riedel, Electric Circuits, 9th Ed, Prentice Hall, 2010.

- Class notes

Reference:

1. R. C. Dorf and J. A. Svoboda, Introduction to Electric Circuits, 9th Ed, John Wiley & Sons, 2014

Other supplemental materials: Class notes

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course covers the following topics: Transient analysis by classical methods and by Laplace transform analysis, step and impulse response. Passive and active filter circuit design. Introduction to Fourier series. Two-Port Network and Special seminars.

b. Prerequisites or co-requisites

Prerequisite: MA023IU – Calculus 3 (for EE major) or EEAC002IU – Mathematics for Engineers (for AC major)

EE051IU – Principles of Electrical Engineering I

Co-requisite: EE056IU – Principle of Electrical Engineering II Laboratory

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Apply principles of engineering, science, and mathematics to identify, formulate, and solve electrical engineering circuits.

2. Have ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

3. Have ability to communicate effectively with a range of audiences.

4. Have ability to engage life-long learning

5. Have an opportunity to participate in seminars to understand the impact of electrical engineering solutions in a global, economic, environmental and social context.

b. The relationship between Course Outcomes (1-5) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						
Course Outcome No.2						x	
Course Outcome No.3			x				
Course Outcome No.4							x
Course Outcome No.5				x			
Total(%)	60		10	10		10	10
ABET Evidences	HWs Quizzes Exams		Presentation	Quiz from seminar		Report Presentation	Quiz from seminar

Course grading policies:

Homework Problem, Class conduct, Seminars and Quizzes (30%)

Mid-term exam (30%)

Final Exam and Term-project (40%)

Note: Term-projects will be assigned after the Mid-term exam period.

7. Brief list of topics to be covered

- Response of first-order RL and RC circuit: natural and step responses, sequential switching and unbounded response.
- Response of second-order RLC circuits.
- Introduction to Laplace transform: definition, step and impulse functions, functional and operational transform, inverse transform, poles and zeros, initial and final value theorems.
- The application of the Laplace transform in circuit analysis.
- Frequency selective circuits, passive filter design.
- Active filter circuits.
- Fourier Series.
- Two-port circuits.
- Seminars given by specialists/scientists from industries/universities; IU - library.
- Review and final exam.

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: tvsu@hcmiu.edu.vn

8. Independent Learning Experiences:

Homework problems are assigned bi-weekly collected and graded.

9. Course Policies:

Assignment: All assignments need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Tran Van Su.

Principles of Electrical Engineering II Laboratory

1. Course Number and Name

EE056IU — Principles of Electrical Engineering II Laboratory

2. Credit and contact hours

1 credit, four periods (45 minutes per period), once per week

3. Instructor's or course coordinator's name

Nguyen Minh Thien, MEng.

4. Textbooks and Other Required Materials

None

Other supplemental materials:

Laboratory manual supplied by the instructor

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course conducts sequence of laboratory experiments to present and illustrate the operation of basic electronic topics: transient analysis by classical methods and by Laplace transform analysis, step and impulse response, two-port networks, passive and active filter circuit designs.

b. Prerequisites or co-requisites

Prerequisite: None

Co-requisite: EE055-Principles of Electrical Engineering II

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course for both Automatic Control and Electrical Engineering undergraduates.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Apply Knowledge of Mathematics, Science, and Engineering for solving electrical engineering circuits.
2. Design and conduct experiments, analyze results.
3. Use one software (such as: Multisim, Pspice, Altium…) to simulate electrical circuits.
4. Understand the impact of Professional and ethical electrical engineering in case studies.

b. The relationship between Course Outcomes (1-4) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						
Course Outcome No.2	x					x	
Course Outcome No.3	x					x	
Course Outcome No.4	x			x	x		
Total(%)	20			20	20	40	
ABET Evidences	3 Lab reports			3 Lab reports	3 Lab reports	3 Lab reports	

Total Evidence: 3 Lab reports

Course grading policies:

- Presence in laboratory (10%)

- Laboratory experimental sessions (60%): including pre-lab report and laboratory experimental report.

- Final Exam (30%).

7. Brief list of topics to be covered

- Series and parallel resonance
- The R - C series circuit
- Passive Filter
- Step response of R-L-C series branch.
- Fourier series analysis.
- Frequency response of different active filters.
- Steady State Frequency Response Using Bode Plots.

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: nmthien@hcmiu.edu.vn

8. Independent Learning Experiences:

Pre-lab exercises are given before formal lab time. These exercises are required to be finished by each student and presented to the lab instructor.

Lab reports are weekly collected and graded.

9. Course Policies:

Lab completeness: Students are required to complete all of questions given in lab procedure within time permitted for each lab, with the results shown to lab instructor. All lab reports need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each report.

Policy on dishonesty: Students are expected to do their own work. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Nguyen Minh Thien.

Programming for Engineers

1. Course Number and Name

EE057IU — Programming for Engineers

2. Credit and contact hours

Credit hours: 3

3. Instructor's or course coordinator's name

Dr. Minh, Nguyen Ngoc Truong

4. Textbooks and Other Required Materials

Paul Deitel and Harvey Deitel, "C How to Program," 7th edition, Pearson, 2013

Class notes

References:

1. Brian Kernighan and D.Ritchie, "The C Programming Language," 2nd edition, Prentice Hall, 1988

2. Stephen G. Kochan, "Programming in C," 4th edition, Sams. Publishing, 2014

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course is aimed at students with no or little programming experiences. Generally, it endeavors to provide students an understanding about the role of programming that can play in solving problems. The course content thus equips the basic terminologies of principles of programming and data structures via C programming language.

The fundamentals include the history of programming, stepwise refinement and flow-charting, introduction to algorithm analysis; basic data types, type conversion, making decision and looping, branching, I/O operations; functions, recursion; arrays and multiple-subscripted arrays, searching and sorting algorithms; pointers/function pointers; characters and strings; structures, unions, enumerates, operations on bits; introduction to abstract data types; dynamic memory allocation, file processing.

b. Prerequisites or co-requisites

Prerequisite: None

Co-requisite: EE058IU — Programming for Engineers Laboratory

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a major required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Implement C instructions, data types and programming techniques to solve simple problems

2. Use novel computing technology, translate hypothesis as well as solutions into computer programs

3. Explain the impact of electrical engineering solutions in a global, economic, environmental and social context

4. Use collaboration skill with teammates

5. Implement C into systems.

b. The relationship between Course Outcomes (1-5) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						
Course Outcome No.2				x		x	
Course Outcome No.3	x	x					
Course Outcome No.4					x		
Course Outcome No.5		x					
Total(%)	40	20		10	10	20	
ABET Evidences	8 HWs	8 HWs 3 Quizzes		8 HWs 3 Quizzes	1 Group project	1 Midterm 1 Final	

Total ABET Evidences:

1. 8 HWs (low, middle, high grade), 3 Quizzes (low, middle, high grade), 1 Group Project (low, middle, high grade)

2. 1 Midterm (low, middle, high grade) and 1 Final (low, middle, high grade)

Course grading policies

Homework Problem, Class conduct, and Quizzes (30%)

Mid-term exam (30%)

Final Exam and Term-project (40%)

Note: Term-projects will be assigned after the Mid-term exam period

7. Brief list of topics to be covered

- Introduction to Programming Fundamentals, Computers and C Programming
- Algorithm and Flow-Charting
- Variables, Data Types and Arithmetic Expressions
- Making Decisions, Branching and Looping, Input and Output Operations in C
- Working with C Functions/Recursion, C Arrays, C Pointers/Pointers to Functions, Structures/Unions/Enumerates
- Characters and Strings, Operations on Bits
- Linked Lists, Queues, Stacks, Binary Trees, AVL Trees
- Dynamic Memory Allocation/File Processing

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: nntminh@hcmiu.edu.vn or ngoctruongminh.nguyen@gmail.com

8. Independent Learning Experiences:

Homework problems are assigned weekly or bi-weekly collected and graded.

9. Course Policies:

Assignments: Students must use the official template of SEE to write their reports. All assignments need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Minh, Nguyen Ngoc Truong.

Programming for Engineers Laboratory

1. Course Number and Name

EE058IU — Programming for Engineers Laboratory

2. Credit and contact hours

Credit hours: 1

3. Instructor's or course coordinator's name

Dr. Minh, Nguyen Ngoc Truong

4. Textbooks and Other Required Materials

Paul Deitel and Harvey Deitel, "C How to Program," 7th edition, Pearson, 2013

Class notes

References:

1. Brian Kernighan and Dennis Ritchie, "The C Programming Language," 2nd edition, Prentice Hall, 1988

2. Stephen G. Kochan, "Programming in C," 4th edition, Sams. Publishing, 2014

5. Specific course information

a. Brief description of the content of the course (catalog description)

This laboratory is associated with the Programming for Engineers course and considered as the kick-off course in EE major. It covers everything that students will need to understand the basic concepts covered in the theory course, as well as the implementation of simple-to-complex C programs especially in the field of engineering.

b. Prerequisites or co-requisites

Prerequisite: None

Co-requisite: EE057IU — Programming for Engineers

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a major required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Formulate algorithms to solve simple programming problems

2. Frame and solve unstructured problems, create practical applications to accomplish useful goals

3. Design, implement and test programs using the C techniques (selections, loops, functions, arrays, pointers, characters and strings, structures, etc.) with applications to engineering

4. Recognize modern computing technology, and the place that programming has within the engineering domain

b. The relationship between Course Outcomes (1-4) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x				x		

Course Outcome No.2				x			
Course Outcome No.3		x					
Course Outcome No.4							x
Total(%)	40	20		20	10		10
ABET Evidences	7 HWs	7 HWs 3 Quizzes		7 HWs 3 Quizzes	3 Quizzes		3 Quizzes 1 Final

Total ABET Evidences:

1. 7 HWs (low, middle, high grade)
2. 3 Quizzes (low, middle, high grade)
3. 1 Final (low, middle, high grade)

Course grading policies

Homework Problem, Class conduct, and Quizzes (70%)

Final Exam (30%)

7. Brief list of topics to be covered

- Variables, Data Types, Type Conversion
- Making Decisions, Branching and Looping
- Algorithm and Flow-Charting
- I/O operations
- Functions/Recursion
- Arrays
- Pointers/Function Pointers
- Structures/Unions/Enumerates
- Characters and Strings
- Operations on Bits/Linked Lists
- Dynamic Memory Allocation/File Processing

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: nntminh@hcmiu.edu.vn or ngoctruongminh.nguyen@gmail.com

8. Independent Learning Experiences:

Homework problems are assigned weekly or bi-weekly collected and graded.

9. Course Policies:

Assignments: Students must use the official template of SEE to write their reports. All assignments need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Minh, Nguyen Ngoc Truong

Principles of Communication Systems

1. Course Number and Name

EE068IU — Principles of Communication Systems

Prerequisite by topics:

1. Signals
2. Fourier Series and Transforms
3. Linear Systems Theory
4. Probability

2. Credit and contact hours

Credit hours: 3

3. Instructor's or course coordinator's name

Dr. Huynh Vo Trung Dung

4. Textbooks and Other Required Materials

S. Haykin, Communication Systems, 4th Ed, John Wiley, 2001

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course covers basic analog and digital communication system theory and design, with an emphasis on wireless communications methods

b. Prerequisites or co-requisites

Prerequisite: MA026IU — Probabilities and Random Processes

EE088IU — Systems and Signals

Co-requisite: EE115IU — Principles of Communication Systems Laboratory

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Understand the basic concept of information
2. Understanding of amplitude and frequency modulation and demodulation methods including synchronous demodulation, nonlinear demodulation and phase-locked loops
3. Understanding of digital communication basics including matched filters, signal space methods and optimal receiver design
4. Be able to analyze and design baseband digital communication systems: Pulse code modulation, Delta and Differential pulse code modulation and Wave shaping

b. The relationship between Course Outcomes (1-4) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						

Course Outcome No.2	x						
Course Outcome No.3	x						
Course Outcome No.4				x			x
Total(%)	40%			30%			30%
ABET Evidences	3 HW 3 Quizzes			3 group projects			3 Midterms 3 Finals

7. Brief list of topics to be covered

1. Introduction and Linear Systems Review
2. AM Modulation/Demodulation/Receivers, Multiplexing
3. FM Modulation/Demodulation/Receivers, Multiplexing
4. Noise Characterization, Noise in AM/FM Systems
5. Sampling and PAM, Probability Review
6. Simple Quantization, Convexity, Loyd-Max Quantization
7. Delta Modulation, Adaptive Modulation
8. Pulse Code Modulation
9. Digital Transmission and Line Coding
10. Digital Modulation
11. Digital Communication System
12. Review and Final Examination

How course outcomes are assessed:

- 15% for assignments, in-class quizzes
- 20% for project
- 25% for midterm examination
- 40% for final examination

Computer Usage:

Students use computer simulation to support learning.

Laboratory Experiences:

There is a separate course EE069IU associated with this course.

Design Experiences: not required.

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: hvtdung@hcmiu.edu.vn

8. Independent Learning Experiences:

Homework problems are assigned bi-weekly collected and graded.

9. Course Policies:

Assignments: All assignments need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Dr. Huynh Vo Trung Dung.

Principles of Communication Systems Laboratory

1. Course Number and Name

EE115IU — Principles of Communication Systems Laboratory

2. Credit and contact hours

Credit hours: 1

3. Instructor's or course coordinator's name

Dr. Huynh Vo Trung Dung

4. Textbooks and Other Required Materials

- Laboratory Manual supplied by the instructor
- S. Haykin, Communication Systems, 4th Ed, John Wiley, 2001

Other supplemental materials:

- Laboratory documents
- Students use the computer Lab-Volt software to do exercises in Laboratory

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course provides experiments dealing with fundamental concepts of communication systems. It includes the following topics: Amplitude Modulation/Demodulation; Angle Modulation/Demodulation; Sampling, Holding and Reconstruction of PAM signals; Pulse Code Modulation.

b. Prerequisites or co-requisites

Prerequisite: EE088IU — Systems and Signals

Co-requisite: EE068IU — Principles of Communication Systems

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. An ability to operate laboratory equipment and to work in group to solve a practical lab problem
2. An ability of to analyze and design the amplitude and frequency modulation and demodulation systems including synchronous demodulation, nonlinear demodulation and phase-locked loops
3. An ability to analyze and design baseband digital communication systems: Pulse Amplitude Modulation, Pulse code modulation, Delta and Differential pulse code modulation and Wave shaping
4. Have an opportunity to exam case studies to understand the professional and ethical responsibility as an engineer

b. The relationship between Course Outcomes (1-4) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1				x			
Course Outcome No.2	x	x				x	
Course Outcome No.3	x	x				x	
Course Outcome No.4				x			
Total(%)	35	10		20		35	
ABET Evidences	3 Exams 3 Lab Reports	3 Exams 3 Lab Reports		3 Lab Reports		3 Exams 3 Lab Reports	

7. Brief list of topics to be covered

1. Amplitude Modulation
2. Generation of AM Signals
3. Reception of AM Signals
4. Frequency Modulation
5. Generation of FM Signals
6. Sampling and PAM
7. Review and Lab Test
8. Professional and ethical case studies

How course outcomes are assessed:

- 10% for Pre-Lab
- 60% for Lab Test and Report
- 30% for final examination

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: hvtdung@hcmiu.edu.vn

8. Independent Learning Experiences:

Lab reports are weekly collected and graded.

9. Course Policies:

Lab report: Students must use the official template of SEE to write their reports. All reports need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Dr. Huynh Vo Trung Dung.

Power Electronics

1. Course Number and Name

EE079IU — Power Electronics

2. Credit and contact hours

Credit hours: 3

3. Instructor's or course coordinator's name

Dr. Nguyen Van Binh

4. Textbooks and Other Required Materials

[1] N. Mohan, T. Undeland and W. Robbins, Power Electronics, Wiley, 3rd Edition, 2003.

Other supplemental materials:

[1] M. Rashid, Power Electronics, Prentice-Hall, 3rd Edition, 2003.

[2] I. Batarseh, Power Electronics Circuits, Wiley, 2003.

5. Specific course information

a. Brief description of the content of the course (catalog description)

The course introduces principles of power electronics, including the understanding of power semiconductor devices, passive components, basic switching circuits, AC/DC, DC/DC, DC/AC converters and their applications.

b. Prerequisites or co-requisites

Prerequisite: None

Co-requisite: Electrical circuit theory

Semiconductor devices

Basic electromagnetic theory

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course for both Automatic Control and Electrical Engineering undergraduates.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

CO1. Understand the basic theory of power semiconductor devices and passive components, their practical applications in power electronics

CO2. Demonstrate the design AC-DC, DC-DC, AC-AC, DC-AC conversion circuits.

CO3. Understand the role power electronics play in the improvement of energy usage efficiency and the development of new technologies.

b. The relationship between Course Outcomes (1-3) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						
Course Outcome No.2		x					
Course Outcome No.3	x						
Total(%)	60	40					

ABET Evidences	3 Quizzes 3 Finals	3 Quizzes 3 Midterms					

7. Brief list of topics to be covered

- Introduction to power electronics, elementary switching circuit, power semiconductor devices, device loss calculation
- Power and harmonics concepts, power factor, Fourier analysis, harmonic distortion, Passive components
- Uncontrolled rectifiers including single phase half-wave, full-wave rectifiers, three phase rectifier
- Controlled rectifiers, half-wave, full-wave and three-phase controlled rectifiers
- Non-isolated DC-DC converters, buck (single-ended chopper) converter, boost, buck-boost converters, switching loss and efficiency estimation
- DC-AC inversion, pulse-width-modulation (PWM) techniques, harmonic reduction, three-phase inverter
- Review of advanced power sources, world energy review, fuel cell power, wind power, solar power
- Review

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: nvbinh@hcmiu.edu.vn

8. Independent Learning Experiences:

Homework problems are assigned bi-weekly collected and graded.

9. Course Policies:

Assignments/Projects: All assignments or projects need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment/project.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Dr. Nguyen Van Binh.

Power Electronics Laboratory

1. Course Number and Name

EEAC003IU — Power Electronics Laboratory

2. Credit and contact hours

Credit hours: 1

3. Instructor's or course coordinator's name

Dr. Nguyen Van Binh

4. Textbooks and Other Required Materials

Lab manual and Handouts of experiments of power electronics.

Other handouts supplied by the instructor.

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course assists the theoretical course (Power electronics) involving the energy conversion and control. It conducts sequence of laboratory experiments in building and measurement of rectifiers, inverters, and DC/DC converters. For filters, this course gives the analysis and measurement and for power semiconductor devices, it carries out the investigation of current-voltage characteristics.

b. Prerequisites or co-requisites

Prerequisite: EE090IU — Electronic Devices

Co-requisite: EE079IU — Power Electronics

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course for both Automatic Control and Electrical Engineering undergraduates.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

CO1. Demonstrate the basic theory of power semiconductor devices and passive components, their practical applications in power electronics.

CO2. Ability to implement and analyze AC-DC, DC-DC, AC-AC, DC-AC conversion circuits.

CO3. Ability to function effectively on a team whose members together provide leadership, create a collaborative.

CO4. Have an opportunity to exam case studies to understand the professional and ethical responsibility as an engineer.

b. The relationship between Course Outcomes (1-4) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						
Course Outcome No.2	x						
Course Outcome No.3					x		
Course Outcome No.4					x		
Total(%)	50				50		

ABET Evidences	3 Lab reports				3 Lab reports		

7. Brief list of topics to be covered

- Characteristic of SCR
- Characteristic of TRIAC
- Characteristics of MOSFET
- V-I relationship of IGBT
- Controlling voltage by using TRIAC
- DC/DC Converters
- Inverters

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: nvbinh@hcmiu.edu.vn

8. Independent Learning Experiences:

Lab reports are weekly collected and graded.

9. Course Policies:

Lab report: Students must use the official template of SEE to write their reports. All reports need to be submitted on the due date.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Dr. Nguyen Van Binh.

Micro-Processing Systems

1. Course Number and Name

EE083IU — Micro-processing Systems

2. Credit and contact hours

Credit hours: 3

3. Instructor's or course coordinator's name

M.Eng Vo Minh Thanh

4. Textbooks and Other Required Materials

The AVR Microcontroller and Embedded System, Mazidi, Naimi, and Naimi, Prentice Hall, Copyright 2011, ISBN 0-13-800331-9.

Lecture Notes.

References:

Assembly Language for Intel-Based Computers, Irvine, 4th Edition, Prentice Hall, 2003, ISBN 0-13-091013-9.

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course provides students the fundamentals of microprocessors and microcontroller; data flow; machine programming; assembly languages, architectures and instructions sets; stacks, subroutines, I/O, and interrupts; interfacing fundamentals; designing with microprocessors, and applications of micro-processing systems to some practical problems.

b. Prerequisites or co-requisites

Prerequisite: EE053 — Digital Logic Design

Co-requisite: EE084 — Micro-processing Systems Lab

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Understand the basic computer organization.
2. Understand the design and operation of a microcontroller
3. Apply the Assembly language and C language to develop firmware for microcontroller
4. Design the Microcontroller based applications for a specific purpose

b. The relationship between Course Outcomes (1-4) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						
Course Outcome No.2	x						

Course Outcome No.3	x	x				x	
Course Outcome No.4		x				x	
Total(%)	40	20				40	
ABET Evidences	Exams HWs	Written report Presentation				Written report Presentation	

7. Brief list of topics to be covered

- Introduction to Computing; Microprocessors and Microcontrollers fundamentals;
- Introduction to AVR Microcontrollers; AVR
- Microcontroller Architecture and Assembly Language Programming
- AVR Instruction Set ; Assembly language programming
- AVR IO Port programming
- Advanced Assembly language programming; AVR Addressing Modes
- AVR Programming in C ; Project Proposal submission
- AVR Timers and Interrupt programming; Serial port programming
- IO Interfacing; LCD and keypad
- Interfacing A/D and D/A Converters, Sensors
- Interfacing with motors & relays, PWM programming
- SPI and I2C Communication protocols, AVR Applications
- Project Demo & Presentation
- Final Exam Review

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: vmthanh@hcmiu.edu.vn

8. Independent Learning Experiences:

Homework problems are assigned bi-weekly collected and graded.

9. Course Policies:

Assignment: All assignments need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Vo Minh Thanh.

Micro-processing Systems Lab

1. Course Number and Name

EE084IU — Micro-processing Systems Lab

2. Credit and contact hours

Credit hours: 1

3. Instructor's or course coordinator's name

M.Eng Vo Minh Thanh

4. Textbooks and Other Required Materials

Lab manuals

References:

Muhammad Ali Mazidi and Sarmad Naimi and Sepehr Naimi, The AVR Microcontroller and Embedded Systems: Using Assembly and C, 1st Ed., Prentice Hall, 2010.

5. Specific course information

a. Brief description of the content of the course (catalog description)

In this course the students will study and do experiments with AVR microcontroller development KIT. Student will be able to practice with following topics: assembly languages, architectures and instructions sets; stacks, subroutines, I/O, and interrupts; peripheral interfacing fundamentals; designing with microprocessors, and applications of micro-processing systems to some practical problems.

b. Prerequisites or co-requisites

Prerequisite: EE053 — Digital Logic Design

Co-requisite: EE083 — Micro-processing Systems

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. An ability to design and conduct experiments with microcontroller as well as to analyze and interpret data.

2. An ability to implement Assembly programs and C programs for microcontrollers to interface with different peripherals.

3. An ability to identify, formulate, and solve engineering problems using microcontroller based solutions.

4. Ability to work in team or group.

5. An Ability to design an application using microcontrollers with professional and ethical responsibility as an engineer.

b. The relationship between Course Outcomes (1-5) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						
Course Outcome No.2	x						
Course Outcome No.3	x	x				x	
Course Outcome No.4		x			x	x	
Course Outcome No.5					x	x	
Total(%)	40	20				40	
ABET Evidences	Exams	Written Reports			Written Reports Presentation	Written Reports	

7. Brief list of topics to be covered

- Trainer familiarization
- Assembly languages, instructions sets; stacks, subroutines,
- Memory interfacing, programming: addressing modes
- General Input/Output,
- Interrupts;
- Timers
- ADC conversion (polling and interrupt method)
- UART interfaces
- SPI Interfaces
- Microprocessor applications
- Project demonstration and presentation
- Professional and ethical case studies

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: vmthanh@hcmiu.edu.vn

8. Independent Learning Experiences:

Prelab are assigned are collected before lab session.

Lab report are collected after lab session and graded.

9. Course Policies:

Prelab and report: Students must use the official template of SEE to write their reports. All required documents need to be submitted on time. Otherwise, a penalty of 20% per day can be considered for the report. A penalty of 10% can be considered for the missing prelab.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Vo Minh Thanh.

Signals and Systems

1. Course Number and Name

EE088IU — Signals and Systems

2. Credit and contact hours

Credit hours: 3

3. Instructor's or course coordinator's name

MEng. Do Ngoc Hung

4. Textbooks and Other Required Materials

[1] A. Poularikas, Signals and Systems with Primer with MATLAB, CRC Press, 2007.

[2] V. Oppenheim, A. S. Willsky with S. Hamid, Signals and Systems, Prentice Hall, 2nd ed., 1996.

Other supplemental materials:

[1] B.P. Lathi, Linear Systems and Signals, Oxford University Press Inc., 2005.

[2] Lecture notes

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course provides fundamentals of signals and systems and develops skills to analyze linear dynamic systems in both continuous and discrete-time domains. It covers the methods used to obtain the system response in both time domain (using convolution methods) and frequency domain (using Fourier, Laplace, and Z transform), and examine the stability of the system.

b. Prerequisites or co-requisites

Prerequisite: EE055 — Principles of EE II

Co-requisite: EE089 — Signals and Systems Laboratory

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course for both Automatic Control and Electrical Engineering undergraduates.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Be able to define and differentiate the continuous and discrete signals with their characteristics into real systems and engineering applications.

2. Apply methods to analyze the characteristics of the signals and perform stability analysis of the systems.

3. Have the ability to engage life-long learning.

4. Understand the professional and ethical responsibility as an engineer.

5. Understand engineering methods including signal representation, signal analysis, and computer skills.

b. The relationship between Course Outcomes (1-5) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	X						
Course Outcome No.2	X						
Course Outcome No.3							X
Course Outcome No.4				X			
Course Outcome No.5						X	
Total(%)	50			10		30	10
ABET Evidences	3 Quizzes 3 HW 3 Midterms 3 Finals			3 Quizzes 3 HW		3 Quizzes 3 HW	3 Quizzes 3 HW

7. Brief list of topics to be covered

- Introduction of signal
- System & System Properties
- Discrete time and Continuous time Convolution methods
- Linear Time Invariant System Properties
- Fourier Series and Fourier Transforms
- Laplace Transform
- Z-Transform
- Sampling
- Seminars given by specialists/scientists from industries/universities; IU – library

How course outcomes are assessed:

- 30% for assignments, in-class quizzes
- 30% for midterm examination
- 40% for final examination

Computer Usage:

Students use computer simulation to support learning

Laboratory Experiences:

There is a separate course EE089IU associated with this course

Design Experiences: not required

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: dnhung@hcmiu.edu.vn

8. Independent Learning Experiences:

Homework problems are assigned bi-weekly collected and graded.

9. Course Policies:

Assignments: All assignments need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: MEng. Do Ngoc Hung.

Signals and Systems Laboratory

1. Course Number and Name

EE089IU — Signals and Systems Laboratory

2. Credit and contact hours

Credit hours: 1

3. Instructor's or course coordinator's name

MEng. Do Ngoc Hung

4. Textbooks and Other Required Materials

- Laboratory Manual supplied by the instructor
- Z. Gajic, Linear Dynamic Systems and Signals, Prentice-Hall, 2003

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course covers the following topics: Experimental exercises via simulation using MATLAB to get understanding of frequency and time domain analysis of linear dynamic systems and corresponding signals. Finding the response of continuous-time and discrete-time linear systems via simulation.

b. Prerequisites or co-requisites

Prerequisite: EE055IU — Principles of EE II

Co-requisite: EE088 — Signals and Systems

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Design and conduct experiment, analyze results
2. Use MATLAB software to write programs about some signals and systems topics and know how to write lab report
3. Understand the basic knowledge about the main parts of a typical communication system
4. Have an opportunity to exam case studies to understand the professional and ethical responsibility as an engineer

b. The relationship between Course Outcomes (1-4) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1				x		x	
Course Outcome No.2						x	
Course Outcome No.3				x			
Course Outcome No.4				x			
Total(%)				40		60	
ABET Evidences				3 Exams		3 Lab Reports	

				3 Lab Reports			

7. Brief list of topics to be covered

1. Introduction to MATLAB
2. Elementary Signals
3. Mathematical Description of Signals
4. Systems
5. Fourier Series
6. Time-Domain System Analysis and Laplace Transform
7. Fourier Transform and Fourier Analysis Discrete-Time Signals
8. Review and Final Examination

How course outcomes are assessed:

- 10% for Pre-Lab
- 60% for Lab Test and Report
- 30% for final examination

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: dnhung@hcmiu.edu.vn

8. Independent Learning Experiences:

Lab reports are weekly collected and graded.

9. Course Policies:

Lab report: Students must use the official template of SEE to write their reports. All reports need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: MEng. Do Ngoc Hung.

Electronics Devices

1. Course Number and Name

EE090IU — Electronics Devices

2. Credit and contact hours

3 credits, Three periods (50 minutes per period), once per week.

3. Instructor's or course coordinator's name

Mr. Tran, Van Su.

4. Textbooks and Other Required Materials

A. S. Sedra and K. C. Smith, Microelectronic Circuits, 6th edition, Oxford University Press, 2010.

(First 6 chapters).

Other supplemental materials:

Class notes.

5. Specific course information

a. Brief description of the content of the course (catalog description)

Fundamentals of semiconductor devices and microelectronic circuits, characteristics of p-n, Zener diodes, analog diode circuits, and applications. Principles of MOSFET and BJT operation, biasing, transistor analysis at midband frequencies.

b. Prerequisites or co-requisites

Prerequisite: EE055IU — Principles of Electrical Engineering II

Co-requisite: EE091IU — Electronics Devices Laboratory

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Apply the principles and operations of electronics in practice;
2. Apply critical and analytic thinking to the planning of electronic devices;
3. Demonstrate creative thinking in the design of electronic devices;
4. Work in team to finish a team small project.

b. The relationship between Course Outcomes (1-4) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						
Course Outcome No.2		x			x		
Course Outcome No.3	x				x		
Course Outcome No.4					x		
Total(%)							

ABET Evidences	3 Midterms 3 Finals	3 group project reports			3 HW 3 Quizzes		

Course grading policies:

Homework Problem, Class conduct, Seminars and Quizzes (30%)

Mid-term exam (30%)

Final Exam and Term-project (40%)

7. Brief list of topics to be covered

1. Introduction. Analog and digital signals, amplifiers, circuit models for amplifiers, network theorems.

2. Operational Amplifiers, Ideal Op Amp, inverting & non-inverting configurations, Op Amp circuits, non-ideal performance.

3. Diodes, Ideal diode, terminal characteristics, analysis of diode circuits, small signal analysis.

4. PN junction under reverse-bias, PN junction under forward bias, zener diodes, Diode applications, diode circuit design.

5. Bipolar Junction Transistors; Physical structures and models of operation, PNP & NPN transistors

6. DC analysis, BJT as an amplifier.

7. Single stage amplifier configurations; BJT in cut-off and saturation; BJT circuit applications and circuit design.

8. Field-Effect Transistors, structure and physical operation of enhancement-type and depletion type MOSFET.

9. FET as an amplifier, biasing circuits and biasing design; Basic configuration of single-stage FET amplifiers.

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: tvsu@hcmiu.edu.vn

8. Independent Learning Experiences:

Homework problems are assigned bi-weekly collected and graded.

9. Course Policies:

Assignment: All assignments need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Tran Van Su, Msc.

Electronics Devices Laboratory

1. Course Number and Name

EE091IU — Electronics Devices Laboratory

2. Credit and contact hours

1 credit, four periods (45 minutes per period), once per week.

3. Instructor's or course coordinator's name

MEng. Nguyen Minh Thien

4. Textbooks and Other Required Materials

None

Other supplemental materials:

Laboratory Manual supplied by the instructor.

5. Specific course information

a. Brief description of the content of the course (catalog description)

Laboratory experiments in microelectronic circuits using semiconductor devices, including diodes,

MOSFETs and BJTs. Employing a learn-by-doing approach, emphasizing the hands-on-experimental

experiences and computer simulation.

b. Prerequisites or co-requisites

Prerequisite: EE055IU — Principles of Electrical Engineering II

Co-requisite: EE090IU — Electronics Devices

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course for both Automatic Control and Electrical Engineering undergraduates.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Apply the principles and operations of electronics in practice.
2. Apply critical and analytic thinking to the planning of electronic devices.
3. Demonstrate creative thinking in the design of electronic devices.
4. Have an opportunity to exam case studies to understand professional and ethical responsibility as an engineer.

b. The relationship between Course Outcomes (1-4) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1						x	
Course Outcome No.2					x		
Course Outcome No.3	x						
Course Outcome No.4							x
Total(%)	20				20	40	20

ABET Evidences	3 Lab reports				3 Lab reports	3 Lab reports	3 Lab reports

Total Evidence: 03 Lab reports.

Course grading policies:

- Presence in laboratory (10%)

- Laboratory experimental sessions (60%): including pre-lab report and laboratory experimental report.

- Final Exam (30%).

7. Brief list of topics to be covered

- Introduction and Laboratory Equipment.
- RC Circuits and Operational Amplifier
- Semiconductor Junction Diode
- Bipolar Junction Transistors: I-V Characteristics and Biasing.
- Bipolar Junction Transistors: Amplifier Topologies
- MOSFET Transistors
- Professional and ethical case studies.

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: nmthien@hcmiu.edu.vn

8. Independent Learning Experiences:

- A pre-lab exercises are given before formal lab time. These exercises are required to be finished by each student and presented to the lab instructor.

- Lab reports are weekly collected and graded.

9. Course Policies:

Lab completeness: There are a total of 7 labs. Students must use the official template of SEE to write their reports. Students are required to complete all of questions given in lab procedure within time permitted for each lab, with the results shown to lab instructor.

Policy on dishonesty: Students are expected to do their own pre-lab exercises at all times. Any evidence of plagiarism or cheating will be treated as grounds for a penalty of 10% in the lab.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Nguyen Minh Thien.

Digital Signal Processing

1. Course Number and Name

EE092IU — Digital Signal Processing

2. Credit and contact hours

Credit hours: 3

3. Instructor's or course coordinator's name

Prof. Lê Tiến Thường

4. Textbooks and Other Required Materials

- S. J. Orfanidis, Introduction to Signal Processing, 2nd Ed, Prentice –Hall, 1996

- Class notes

Reference:

1. A. V. Oppenheim, R. W. Schafer, Discrete-time Signal Processing, 2nd Ed, Prentice Hall

2. V. K. Ingle and J. G. Proakis, Digital Signal Processing Using Matlab, PWS Publishing Company

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course is an introduction to the basic principles, methods, and applications of digital signal processing, emphasizing its algorithmic, computational, and programming aspects. In particular, the students will learn the conversion from analog to digital, the concepts of discrete time linear systems, filtering, spectral analysis of discrete time signals and filter design.

b. Prerequisites or co-requisites

Prerequisite: EE088IU — Signals and Systems

Co-requisite: EE093IU — Digital Signal Processing Laboratory

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Apply knowledge of mathematics, science and engineering to solve digital signal processing problem

2. Understand the sampling, quantization process as well as the basic discrete-time systems concepts

3. Illustrate the design of digital filter by various methods to meet prescribed specifications

b. The relationship between Course Outcomes (1-3) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						

Course Outcome No.2		x					
Course Outcome No.3				x			
Total(%)	30	30		40			
ABET Evidences	3 Assignments	3 Midterm Examinations		3 Final Examinations			

7. Brief list of topics to be covered

1. Introduction to Digital Signal Processing
2. Analog Signal Processing – Sampling and Reconstruction
3. Quantization process with Over – Sampling and Noise Shaping
4. Analysis of Linear Time Invariant Systems
5. Finite Impulse Response of LTI Systems - Convolution
6. Z- transform and its applications to the analysis of LTI systems
7. Discrete Fourier transform (DFT) and Fast Fourier transform (FFT)
8. Frequency response digital filter designs
9. Digital filter realization – block diagrams and structures, signal flowchart
10. Filter design techniques (FIR, IIR)

How course outcomes are assessed:

- 30% for homework, in-class quizzes
- 30% for midterm examination
- 40% for final examination

Computer Usage:

Students use computer simulation to support learning

Laboratory Experiences:

There is a separate course EE093IU associated with this course

Design Experiences: not required

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information:

8. Independent Learning Experiences:

Homework problems are assigned, collected and graded.

9. Course Policies:

Lab completeness: All assigned homework needs to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each one.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Dr. Ton That Long.

Digital Signal Processing Laboratory

1. Course Number and Name

EE093IU — Digital Signal Processing Laboratory

2. Credit and contact hours

Credit hours: 1

3. Instructor's or course coordinator's name

Dr. Nguyễn Hoàng An

4. Textbooks and Other Required Materials

1. S. J. Orfanidis, Introduction to Signal Processing, Prentice–Hall, 1996, ISBN 0-13-209172-0

2. M. D. Lutovac, D. V. Tošić, B. L. Evans, Filter Design for Signal Processing Using MATLAB and Mathematica, Prentice Hall, 2001

3. Lab Manual

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course is an introduction to the basic principles, methods, and applications of digital signal processing, emphasizing its algorithmic, computational, and programming aspects.

b. Prerequisites or co-requisites

Prerequisite: EE088IU — Signals and Systems

Co-requisite: EE092IU — Digital Signal Processing

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Design and implement digital signal processing algorithms in MATLAB software

2. Solve the problems efficiently by individuals and by groups. Understand teamwork and write a report.

b. The relationship between Course Outcomes (1-2) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1						x	
Course Outcome No.2					x		
Total(%)					70	30	
ABET Evidences					3 Written Lab Reports	Examination 3 Written Lab Reports	

7. Brief list of topics to be covered

1. Sampling and Reconstruction of analog signals.

2. Sampling, Quantizing, and Coding

3. Convolution

4. Z transform

5. Z transform and Transfer Function

6. Fourier Analysis of Discrete-Time Signals

7. FIR and IIR filters

8. Review and Final Exam

How course outcomes are assessed:

- 70% for Lab Test and Report

- 30% for final examination

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: ttlong@hcmiu.edu.vn

8. Independent Learning Experiences:

Homework problems are assigned, collected and graded.

9. Course Policies:

Lab report: Students must use the official template of SEE to write their reports. All reports need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Dr. Ton That Long.

Thesis

1. Course Number and Name

EE097IU — Thesis

2. Credit and contact hours

Credit hours: 10

3. Instructor's or course coordinator's name

MEng. Do Ngoc Hung

4. Textbooks and Other Required Materials:

All related materials

5. Specific course information

a. Brief description of the content of the course (catalog description)

In the field of Electrical Engineering, the thesis focuses on design projects related to the EE field. In addition to the accumulation of theoretical knowledge, the thesis requires solving difficulties encountered in practice as well as addressing safety issues and ethics.

The Thesis is the capstone design project for the SEE undergraduate degree. The capstone project provides the students an integrated understanding of scientific practice and principles in the identify and solving engineering problems.

As a capstone experience, the Thesis combines together many aspects of engineering. Each student's project will demonstrate their knowledge in several areas, including automation, control, embedded systems, RF and microwave technique, and communication systems, special seminar(s).

b. Prerequisites or co-requisites

Prerequisite: - Successfully accumulate at least 90% of credit numbers of the academic curriculum.

- Finish senior project
- Do not be under any academic admonishment.

Co-requisite: None

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Design and execute a meaningful research project that demonstrates spatial thinking and the knowledge about the state-of-the-art issues, standards, and realistic constraints in EE field.
2. Understand the method of writing report and presenting the results.
3. Understand the power of positive attitudes, creative and critical thoughts and active learning.
4. Understand the external, societal and environmental impacts of engineering.
5. Understand the professional and ethical responsibility as an engineer;

b. The relationship between Course Outcomes (1-5) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						
Course Outcome No.2		x	x				
Course Outcome No.3						x	
Course Outcome No.4				x			
Course Outcome No.5							x
Total(%)	10	50	5	5		20	10
ABET Evidences	3 Thesis Reports	3 Thesis Reports	3 PPT Presentations	3 Thesis Reports		3 Thesis Reports	3 Thesis Reports

7. Brief list of topics to be covered

- Professional and ethical case studies
- Seminars related to EE field and soft skills.

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: dnhung@hcmiu.edu.vn

8. Independent Learning Experiences:

Periodical report submission to advisor.

9. Course Policies:

- Must learn theories related to the thesis.
- Collect and study the documents related to the content under the guidance of advisors.
- Report periodically the workflow process for advisor.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the course. The similarity score (checked by Turnitin) is less than or equals to 20%.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Number	Content		Score
Academic and Applicability (max 35%)			
1	**Project scope (max 10%)**		(Max: 10%)
	- Problem statement	Yes No	
	- Recognition of & knowledge of relevant contemporary issues	Yes No	
	- Goals and Objectives	Yes No	
2	**Literature Review and Research methodology (max 10%).**		(Max: 10%)
	- References used for literature review properly cited.	Yes No	

	- Concept generation, Evaluation & Selection.	Yes No		
3	**Project Planning (max 5%).**			(Max: 5%)
	- Task identification	Yes	No	
	- Timeline	Yes	No	
	- Cost	Yes	No	
4	**Realistic constraints (max 5%)**			(Max: 5%)
	- Economic, safety, environmental constraints considered in design	Yes	No	
	- Professional and Ethical issues and other realistic constraints considered in design.	Yes	No	
5	**Engineering standards (max 5%).** - Standards (IEEE, IEC..) considered in design.	Yes	No	(Max: 5%)
Oral Presentation (max 20%)				
1	Presentation (max 10%) **Clear organization and logical flow**			(Max: 10%)
2	English and timing (max 10%)			(Max: 10%)
Topic Understanding (max 45%)				
	Ability of understanding.	Yes	No	(Max: 45%)
	Design analysis.	Yes	No	
	Analyzes and interprets data.	Yes	No	
	Solutions are developed and compared to find the best baseline design.	Yes	No	
	Products or prototypes are built in the project.	Yes	No	
	Total Score			

Prepared by: MEng. Do Ngoc Hung.

Senior Project

1. Course Number and Name

EE107IU — Senior Project

2. Credit and contact hours

Credit hours: 2

3. Instructor's or course coordinator's name

MEng. Do Ngoc Hung

4. Textbooks and Other Required Materials

All related materials

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course provides an opportunity for students to familiarize with the practical issues from the collaboration between industry and professional education.

In the field of Electrical Engineering, the senior focuses on design projects related to the EE field. In addition to the accumulation of theoretical knowledge, the senior project requires solving difficulties encountered in practice as well as addressing safety issues and ethics. The topics will be suggested by industry and the technical details will be considered carefully by students and advisors to help students can apply their theoretical knowledge and practical skills in solving an engineering problem in reality.

The senior project is the capstone design project for the SEE undergraduate degree. The capstone project provides the students an integrated understanding of scientific practice and principles in the identify and solving engineering problems.

As a capstone experience, the senior project combines together many aspects of engineering. Each student's project will demonstrate their knowledge in several areas, including automation, control, embedded systems, RF and microwave technique, and communication systems, special seminar(s).

b. Prerequisites or co-requisites

Prerequisite: - Successfully accumulate at least 75% of credit numbers of the academic curriculum.

- Do not be under any academic admonishment.

Co-requisite: None

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Design and execute a meaningful research project that demonstrates spatial thinking and the knowledge about the state-of-the-art issues, standards, and realistic constraints in EE field.

2. Understand the method of writing report and presenting the results.

3. Understand the power of positive attitudes, creative and critical thoughts and active learning.

4. Understand the external, societal and environmental impacts of engineering.

5. Understand the professional and ethical responsibility as an engineer.

b. The relationship between Course Outcomes (1-5) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						
Course Outcome No.2		x	x				
Course Outcome No.3						x	
Course Outcome No.4				x			
Course Outcome No.5							x
Total(%)	10	50	5	5		20	10
ABET Evidences	3 Reports	3 Reports	3 PPT Presentations	3 Reports		3 Reports	3 Reports

7. Brief list of topics to be covered

- Professional and ethical case studies
- Seminars related to EE field and soft skills.

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: dnhung@hcmiu.edu.vn

8. Independent Learning Experiences:

Periodical report submission to advisor.

9. Course Policies:

- Learn theories related to the senior project.
- Collect and study the documents related to the content under the guidance of advisors.
- Report periodically the workflow process for advisor

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the course. The similarity score (checked by Turnitin) is less than or equal to 20%.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: MEng. Do Ngoc Hung.

Summer Internship

1. Course Number and Name

EE112IU — Summer Internship

2. Credit and contact hours

Credit hours: 3

3. Instructor's or course coordinator's name

MEng. Do Ngoc Hung

4. Textbooks and Other Required Materials

All related materials.

5. Specific course information

a. Brief description of the content of the course (catalog description)

The internship/apprentice program could be a new job or a new experience within an existing job as the work performed in the internship/apprentice program should lead to new learning, discovery or growth for the student and contribute toward the student's academic program. It is important to note, therefore, that many potential jobs will not meet the standards for internship/apprentice program credit.

The internship/apprentice program should provide realistic exposure to career experiences in the student's chosen academic specialization.

The student intern will either find a company to sponsor him or her or perform a specific project at an existing job. The internship program is an agreement between the student, faculty advisor and the company supervisor.

b. Prerequisites or co-requisites

Prerequisite: - Successfully accumulate at least 90% of credit numbers of the academic curriculum.

- Do not be under any academic admonishment.

Co-requisite: None

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Demonstrate the ability to integrate and apply theoretical knowledge and skills developed in various courses to real-world situations

2. Demonstrate a greater understanding about career options while more clearly defining personal career goals.

3. Implement and refine oral and written communication skills.

4. Identify areas for future knowledge and skill development.

b. The relationship between Course Outcomes (1-4) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1						x	
Course Outcome No.2							x
Course Outcome No.3			x		x		
Course Outcome No.4						x	
Total(%)	10		30		30		30
ABET Evidences	3 Written reports		3 PPT presentations		3 Written reports		3 Written reports

7. Brief list of topics to be covered

- None

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: dnhung@hcmiu.edu.vn

8. Independent Learning Experiences:

Internship report submission to supervisor and school of EE.

9. Course Policies:

The students do a minimum or/at least 8 weeks of work at the internship program. However, all internship/apprentice program hours are negotiable and negotiated between the student and the employer.

Students must use the official template to write the internship report.

Students may be required to fill out an evaluation of your internship experience. Student's supervisor may be asked to fill out an evaluation of student's performance as well.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: MEng. Do Ngoc Hung.

Entrepreneurship

1. Course Number and Name

EE114IU — Entrepreneurship

2. Credit and contact hours

3 credits, Four periods (45minutes per period), once per week

3. Instructor's or course coordinator's name

Dr. Nguyen Dinh Uyen

4. Textbooks and Other Required Materials

Technology Entrepreneurship, Thomas N. Duening, Robert D. Hisrich, and Michael A. Lechter, © Elsevier 2010.

Other supplemental materials:

Nurturing Science-based Ventures, Ralf W. Seifert • Benoît F. Leleu, Christopher L. Tucci, © 2008 Springer-Verlag London.

Handouts including research papers given by instructor for in-depth references of the topics.

5. Specific course information

a. Brief description of the content of the course (catalog description)

In this course the student will learn the essential skills needed to start and manage a successful new business venture. Topics will cover: the challenge of entrepreneurship, building a business plan, marketing and financial issues with a start-up company, and how to gain the competitive advantage.

b. Prerequisites or co-requisites

Prerequisite: None

Co-requisite: None

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Describe the entrepreneurial profile and evaluate your potential as an entrepreneur.
2. Explain the steps the entrepreneur must complete when starting a new business venture.
3. Complete a written business plan and demonstrate the keys to making an effective business plan presentation.
4. Gain the experience of working in a group towards a final project that will involve experiments, analysis and the design of exemplary wireless communication techniques and/or systems.
5. Have an opportunity to participate in seminars to understand the impact of electrical engineering solutions in a global, economic, environmental, and social context.

b. The relationship between Course Outcomes (1-5) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1		x					
Course Outcome No.2		x					
Course Outcome No.3			x	x			
Course Outcome No.4					x		
Course Outcome No.5				x			
Total(%)		30	30	10	30		
ABET Evidences		3 presentations	3 presentations	3 reports	3 reports		

7. Brief list of topics to be covered

- Fundamental of business
- Micro and macro economics
- Fundamental of economics
- Technology ventures in a global context
- Legal structure and Capital
- Technology venture strategy and operations
- Professional and ethical case studies

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: nduyen@hcmiu.edu.vn

8. Independent Learning Experiences:

Homework problems are assigned bi-weekly collected and graded.

9. Course Policies:

Assignments: All assignments need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Dr. Uyen Nguyen.

Capstone Design Project 1

1. Course Number and Name

EE130IU — Capstone Design 1

2. Credit and contact hours

2 credits, Four periods (45 minutes per period), once per week

3. Instructor's or course coordinator's name

Dr. Nguyen Dinh Uyen

4. Textbooks and Other Required Materials

TBD

Other supplemental materials:

Handouts including research papers given by instructor for in-depth references of the topics.

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course is an introduction to engineering design process. This course consists of two semesters of lecture and design. This course requires students to develop a project based on the knowledge and skills acquired in earlier coursework and integrate their technical knowledge through practical design effort. Students will work in multidisciplinary teams to complete an approved engineering design projects that is fully documented and prototyped. In the Capstone Design Project 1, students will learn to define a problem, conduct research to propose the solutions, determine the realistic constraints, prepare project scheduling, and create a planned budget for the project. The work will be performed as a team in accordance with ABET requirements. Each team is comprised of two to four students. For completing this project, the students are required to defend their works and obtain the committee's evaluation. The committee's member are academics staff, stakeholders, industry visitors, etc.

b. Prerequisites or co-requisites

Prerequisite: EE055IU — Principles of Electrical Engineering II

Co-requisite: None

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Develop system requirements from top-level customer requirements.

2. Analyze and compare design alternatives, at the system and subsystem levels, and use measures of performance or other criteria to rank alternatives

3. Plan and organize an engineering design project using tools such as Gantt charts to develop a work breakdown structure, develop a schedule including milestones, and estimate effort and costs.

4. Develop a design concept and elaborate it through to a detailed design by decomposing a system concept into component subsystems, identifying the subsystem requirements and applicable standards, and defining interfaces between the subsystems

5. Demonstrate the ability to work in a group towards a final project that will involve experiments, analysis and the design of exemplary wireless communication techniques and/or systems

6. Understand the professional and ethical responsibility

b. The relationship between Course Outcomes (1-6) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						
Course Outcome No.2		x					
Course Outcome No.3		x					
Course Outcome No.4	x						
Course Outcome No.5			x		x		
Course Outcome No.6				x		x	
Total(%)	10	30	10	10	30	10	
ABET Evidences	3 Group Reports	3 Group Reports	3 presentations	3 Group Reports	3 Group Reports		

7. Brief list of topics to be covered

- Ethic lecture
- Research direction
- Safety lecture
- Budget planning
- Design reviews
- Analysis and specification of system and subsystem requirements
- Analysis of alternatives
- Measures of performance
- Effective design strategies, brainstorming, collaboration
- Intellectual property
- Project management and scheduling, Gantt chart, MS Project
- Oral presentation skills, effective graphics in presentations
- System characterization, design of qualification tests
- Methods for effective and efficient collaborative development and revision of documents
- Effective teamwork, team expectations, team member evaluation

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: nduyen@hcmiu.edu.vn

8. Independent Learning Experiences:

Homework problems are assigned bi-weekly collected and graded.

9. Course Policies:

Assignments: All assignments need to be submitted on the due date. Otherwise, a penalty of 20% per day can be considered for each assignment.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Dr. Uyen Nguyen.

Capstone Design Project 2

1. Course Number and Name

EE131IU — Capstone Design 2

2. Credit and contact hours

2 credits, The students will be assigned a faculty member to guide and oversee the project.

3. Instructor's or course coordinator's name

Dr. Nguyen Dinh Uyen

4. Textbooks and Other Required Materials

TBD

Other supplemental materials:

Handouts including research papers given by instructor for in-depth references of the topics.

5. Specific course information

a. Brief description of the content of the course (catalog description)

This course is the second course of an introduction to engineering design process. This course consists of two semesters of lecture and design. This course requires students to develop a project based on the knowledge and skills acquired in earlier coursework and integrate their technical knowledge through practical design effort. Students will work in multidisciplinary teams to complete an approved engineering design projects that is fully documented and prototyped. In the Capstone Design Project 2, students will learn to follow the design process and to develop the prototype based on the design specifications from Capstone Design Project 1. The work will be performed as a team in accordance with ABET requirements. Each team is comprised of two to four students. For completing this project, the students are required to defend their works and obtain the committee's evaluation. The committee's member are academics staff, stakeholders, industry visitors, etc.

b. Prerequisites or co-requisites

Prerequisite: EE130IU — Capstone Design 1

Co-requisite: None

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

1. Build prototypes of key subsystems

2. Design appropriate tests to measure and evaluate the performance of prototype subsystems to determine whether they meet performance and interface requirements and recommend changes where they do not.

3. Describe organizational and technical plans and progress in oral presentations, using high-quality, informative, graphical and textual elements.

4. Gain the experience of working in a group towards a final project that will involve experiments, analysis and the design of exemplary systems

5. Understand the professional and ethical responsibility

b. The relationship between Course Outcomes (1-5) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1							x
Course Outcome No.2		x				x	
Course Outcome No.3			x				
Course Outcome No.4					x		
Course Outcome No.5				x			
Total(%)		10	10	10	30	30	10
ABET Evidences		3 Group Reports	3 presentations	3 Group Reports	3 Group Reports		

7. Brief list of topics to be covered

Assigned faculty member will guide the students to complete the prototype.

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: nduyen@hcmiu.edu.vn

8. Independent Learning Experiences:

Depends on the assigned faculty member requirements

9. Course Policies:

Assignments: Depends on the assigned faculty member requirement.

Policy on dishonesty: Students are expected to do their own work at all times. Any evidence of plagiarism or cheating will be treated as grounds for failure in the class.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Dr. Uyen Nguyen.

Engineering Ethics, Professional Skills and Critical Thinking

1. Course Number and Name

EE132IU — Engineering Ethics, Professional Skills and Critical Thinking

2. Credit and contact hours

Credit hours: 3

3. Instructor's or course coordinator's name

Dr. Huynh Vo Trung Dung

4. Textbooks and Other Required Materials

1. M. W. Martin and R. Schinzinger (2010). Introduction to engineering ethics McGraw-Hill Education 2nd edition

2. Bassham, Irwin, Nardone, and Wallace, Critical Thinking: A Student's Introduction, 6th edition, McGraw-Hill Education, 2020

5. Specific course information

a. Brief description of the content of the course (catalog description)

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 professional skills: sharing ideas and concepts regardless of the fact that you may not always agree.

Further, this course also provides the nature and techniques of thought as a basis for our claims, beliefs, and attitudes about the world. 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.

b. Prerequisites or co-requisites

Prerequisite: None

Co-requisite: None

c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

This is a required course.

6. Specific course outcomes

a. Upon the successful completion of this course students will be able to:

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

2. Using different problem-solving techniques to solve ethical dilemmas

3. Analyzing social, environmental, legal aspects, safety and sustainability issues of engineering activities

4. Apply the standards of and avoid barriers to critical thinking in various contexts

5. Identify, construct, and evaluate deductive and inductive arguments in spoken and written forms

6. Develop good arguments to defend personal/group beliefs in respectful manners

b. The relationship between Course Outcomes (1-4) and Student Outcomes (1-7) is shown in the following table:

	1	2	3	4	5	6	7
Course Outcome No.1	x						
Course Outcome No.2				x			
Course Outcome No.3		x		x			
Course Outcome No.4							x
Course Outcome No.5	x						
Course Outcome No.6							x
Total(%)	25	15		30			30
ABET Evidences	HW Quizzes Exam	HW Quizzes Exam		HW Quizzes Exam			HW Quizzes Exam

7. Brief list of topics to be covered

1. Introduction to engineering professionalism and ethics, Moral choices and codes of ethics
2. Ethical problem-solving techniques, Engineers at the Workplaces
3. Truth in actions and words in academic and research ethics
4. Internet ethics, privacy issues and intellectual property rights, commitment to safety
5. Environmental ethics, sustainable engineering
6. Introduction to critical thinking
7. Basic logical concept, a little categorical logic, a little propositional logic, logical fallacies
8. Recognizing arguments, analyzing arguments, evaluating arguments and truth claims
9. Project: group presentation and final Review

How course outcomes are assessed:

- 20% for assignments and in-class quizzes, 10% for presentation
- 30% for midterm examination
- 40% for final examination

Computer Usage:

None

Laboratory Experiences:

None

Design Experiences: None

Lecture hours: depends on semester calendar .

Office hours: based on detailed semester calendar, or by appointment @ O2.206

Contact information: hvtdung@hcmiu.edu.vn

8. Independent Learning Experiences:

Homework is to be handed in before the beginning of class on the session/day it is due. No late homework will be accepted. There will be on average one homework set every two weeks. Since

assigned homework is an integral part of transferring course content to students, they are to be an individual effort but group discussions are encouraged for a better understanding of course material and solving homework. The student must receive a passing homework grade to pass the course.

Students are not allowed to be absent more than 3 days during the course. Otherwise, students are not allowed to take any examination!

9. Course Policies:

Policy on dishonesty: Instances of academic dishonesty will not be tolerated. Cheating on exams 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 assignments 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.

10. Link to download materials: http://blackboard.hcmiu.edu.vn/

Prepared by: Dr. Huynh Vo Trung Dung.