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I. WELCOME TO SCHOOL OF ELECTRICAL ENGINEERING (SEE)

1. About the SEE

Founded in 2004, School of Electrical Engineering (SEE) was among the most distinguished and the earliest members of International University – Vietnam National University Ho Chi Minh City (IU - VNU HCMC). SEE is dedicated to providing strong engineering education in the fields of Electronics & Telecommunications Engineering as well as Control Engineering & Automation.

ET program received the assessment and accreditation of quality by AUN-DAAD in 2013, as well as the accreditation by ABET (Accreditation Board for Engineering and Technology, United States) in 2019. This success has firmed up our motivations and encourages us to pursue a higher level in research and teaching activities.

2. Vision of SEE

Advanced teaching methodology

- ✓ Provide students with the fundamental and advanced theories and link them to engineering applications.
- ✓ Interact with students both inside and outside classrooms.
- ✓ Support students with blended teaching.
- ✓ Inspire students to engage in research and solve technical problems.

State-of-The-Art research

- ✓ Build the modern laboratories involved in research areas of the school and foster students to join.
- ✓ Prepare the academic curriculum involved in research.

Innovation

- ✓ Guide students to comprehend the social, economic, and technical contexts.
- ✓ Encourage students to recognize current and future problems.
- ✓ Teach students creative and critical thinking.
- ✓ Foster students to collaborate with others in solving integrated problems.

3. Missions of SEE

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

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

4. Student Outcomes of SEE

Graduates who have successfully completed the SEE-IU's program are prepared to enter a global workforce and possess these abilities (based on the ABET standard):

1) An ability to identify, formulate, and solve advanced engineering problems by applying principles of engineering, science, and mathematics.
2) An ability to apply advanced 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 at an advanced level 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 advanced 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 advanced experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7) An ability to acquire and apply advanced knowledge as needed, using appropriate learning strategies.

Career Opportunities

Students who graduate from SEE have great chances to:

- Work in domestic or foreign companies related to IC design, consumer electronics, information technology, and automation.
- Develop start-up companies and introduce new electrical and communication products to the market.
- Work in domestic or foreign communication / network corporations, mobile network, air freight companies.
- Develop start-up companies and introduce new electrical and communication products to the market.

II. MASTER PROGRAMS

SEE offers a graduate program at IU, i.e. a full-time master program. Details of these curricula are provided in the following sections. The curricula include a graduate program (Master of Electrical Engineering - MEE) for two Master programs (Coursework Program and Research Program). Students must spend about 02 years and choose to follow either of the two programs: Research Program or Coursework Program, including various specializations:

- Communications
- RF and Antenna
- Microelectronics
- Signal Processing
- Automation / Control
- Sensor and Devices
- Embedded Systems
- Artificial Intelligence Applications

The full-time Master Program (study 02 years at IU, program code: **8520203**) consists of two specific options: (1) *The Research Program* and (2) *The Coursework Program*. Both options lead to the "**Master of Electronics Engineering**" degree (in Vietnamese: **Thạc sĩ Kỹ thuật Điện tử)**. The degree is issued by IU - VNU HCMC.

Every graduate IU program is a credit-based system which is conducted on a semester-basis. SEE provides a solid foundation in core subjects, combined with general and EE elective courses. Students are required to complete at least 60 credits (including thesis) with an English Proficient Certificate to accomplish the program.

The MEE curriculum consists of four main blocks:

1. General Education (01 course - 03 credits)
2. Major Requirement (02 courses - 06 credits)
3. Elective Courses (07 to 11 courses - 21 to 33 credits)
4. Research Project/Internship and Thesis (02 courses - 18 to 30 credits)

1. Research Program

The curriculum map offers a quick summary of the main features of the curriculum.

Note: Choices should be made with planning, and consultation with student's advisor.

Table II.1 Curriculum Map of Research Program

The First Year							
Semester 1		**Credit**	**ECTS**	**Semester 2**		**Credit**	**ECTS**
PE505	Philosophy	3	4.64	EExxx	Elective Course 3	3	4.64
EE500	Research Methodology	2	3.09	EExxx	Elective Course 4	3	4.64
EE505	Linear System and Random Process	4	6.18	EExxx	Elective Course 5	3	4.64
EExxx	Elective Course 1	3	4.64	EExxx	Elective Course 6	3	4.64
EExxx	Elective Course 2	3	4.64	EExxx	Elective Course 7	3	4.64
Total		**15**	**23.2**	**Total**		**15**	**23.2**
The Second Year							
Semester 1		**Credit**	**ECTS**	**Semester 2**		**Credit**	**ECTS**
EE614	Research Project	15	23.2	EE605	Thesis	15	23.2
Total		**15**	**23.2**	**Total**		**15**	**23.2**

Table II.2 List of Courses for Research Program

No.	Course ID	Course Names	Number of credits
I	**GENERAL COURSES**		**3**
1	PE505	Philosophy	3
II	**FUNDAMENTAL COURSES**		**6**
1	EE500	Research Methodology	2
2	EE505	Linear System and Random Process	4
III	**ELECTIVE COURSES (CHOOSE 7 COURSES)**		**21**

1	EE565	Digital and Embedded System Design	3
2	EE569	Digital Processing of Speech and Image Signal	3
3	EE580	Instrumentation and Sensors	3
4	EE534	Advanced Machine Learning and Artificial Intelligence	3
5	EE535	Advanced Internet of Things	3
6	EE536	Advanced Robotics	3
7	EE511	Wireless Communications	3
8	EE513	Data Communications and Networking	3
9	EE561	Advanced Digital Signal Processing	3
10	EE528	Advanced Telecommunications Networks	3
11	EE530	Computational for Electromagnetics	3
12	EE531	Advanced Antenna Design	3
13	EE532	Microwave Circuits and Measurement	3
14	EE533	Monolithic Microwave Integrated Circuit	3
15	EE540	Semiconductor Device Physics	3
16	EE541	VLSI Design	3
17	EE582	Engineering Control Systems	3
18	EE591	Neural Network and Fuzzy Control	3
19	EE592	Optimal Control	3
20	EE594	Fault Diagnostic and System Identification	3
21	EE595	Applied Control Engineering	3
22	EE596	Advanced Theory of Automatic Control	3
23	EE597	Advanced PC Based Control and SCADA System	3
IV	**RESEARCH PROJECT**		**15**
1	EE604	Research Project	15
V	**THESIS**		**15**
1	EE605	Thesis	15
TOTAL			**60**

2. Coursework Program

Table II.3 Curriculum Map of Coursework Program

The First Year							
Semester 1		**Credit**	**ECTS**	**Semester 2**		**Credit**	**ECTS**
PE505	Philosophy	3	4.64	EExxx	Elective Course 3	3	4.64
EE500	Research Methodology	2	3.09	EExxx	Elective Course 4	3	4.64
EE505	Linear System and Random Process	4	6.18	EExxx	Elective Course 5	3	4.64
EExxx	Elective Course 1	3	5.09	EExxx	Elective Course 6	3	5.09
EExxx	Elective Course 2	3	5.09	EExxx	Elective Course 7	3	5.09
Total		**15**	**24.09**	**Total**		**15**	**24.1**
The Second Year							
Semester 1		**Credit**	**ECTS**	**Semester 2**		**Credit**	**ECTS**
EExxx	Elective Course 8	3	4.64	EExxx	Elective Course	3	5.09
EExxx	Elective Course 9	3	4.64	EExxx	Elective Course	3	5.09
EE611	Internship	9	18	EE612	Graduation Project	9	13.91
Total		**15**	**27.28**	**Total**		**15**	**24.09**

Table II.4 List of Courses for Coursework Program

No.	Course ID	Course Names	Number of credits
I	**GENERAL COURSES**		**3**
1	PE505	Phylosophy	3
II	**FUNDAMENTAL COURSES**		**6**
1	EE500	Research Methodology	2
2	EE505	Linear System and Random Process	4

III	ELECTIVE COURSES (CHOOSE 11 COURSES)		33
1	EE565	Digital and Embedded System Design	3
2	EE569	Digital Processing of Speech and Image Signal	3
3	EE580	Instrumentation and Sensors	3
4	EE534	Advanced Machine Learning and AI	3
5	EE535	Advanced Internet of Things	3
6	EE536	Advanced Robotics	3
7	EE511	Wireless Communications	3
8	EE513	Data Communications and Networking	3
9	EE561	Advanced Digital Signal Processing	3
10	EE528	Advanced Telecommunications Networks	3
11	EE530	Computational for Electromagnetics	3
12	EE531	Advanced Antenna Design	3
13	EE532	Microwave Circuits and Measurement	3
14	EE533	Monolithic Microwave Integrated Circuit	3
15	EE540	Semiconductor Device Physics	3
16	EE541	VLSI Design	3
17	EE582	Engineering Control Systems	3
18	EE591	Neural Network and Fuzzy Control	3
19	EE592	Optimal Control	3
20	EE594	Fault Diagnostic and System Identification	3
21	EE595	Applied Control Engineering	3
22	EE596	Advanced Theory of Automatic Control	3
23	EE597	Advanced PC Based Control and SCADA System	3
IV	**INTERNSHIP**		**9**
1	EE611	Internship	9
V	**GRADUATION PROJECT**		**9**
1	EE612	Graduation Project	9
TOTAL			**60**

III. ACADEMIC MATTERS

This section is to give students an enjoyable and effective learning experience.

1. Academic Advisors

The Academic Advisors will support you throughout your university life. Academic advisors can help you to select suitable courses for the next semester and add / drop a course. The advisors help you to achieve your educational goals and to create your plan of study serving your intellectual interests and career goals. Your advisor can help to make sure you are meeting all of your graduation requirements.

The following assigned academic advisors:

- Dr. Phạm Trung Kiên (email: ptkien@hcmiu.edu.vn)

2. Student Email

IU collaborates with Microsoft to provide students with free email service. Please visit https://mail.office365.com and login using the following credentials:

***Username**: <Student ID>*

***Password**: <Provided by Center of Information Services>*

All students are required to use this email account when contacting our university

3. Course Registration

In every semester, you have to do the course registration in which you select the subjects from the curriculum that are suitable to you. Be really careful with your selection because it may affect your Personal Development plan as well as the final achievement of your degree.

Registration guidelines

- The registration time is informed by SEE.
- Make your own decision on the course selection.
- Course registration can be completed online by using the university link https://edusoftmaster.hcmiu.edu.vn// (*username and password will be created by the university*)
- The subject registration must be approved by the academic advisors.
- For some exceptional cases, you can address the problems to Dean of SEE for consideration.

4. Adjusting Student Timetable

You are responsible for checking the information shown in your timetable including the number of registered courses, tuition fees, etc… If you think that there is error in your timetable, please report the issue to the SEE Office. You should do it within three days since the announcement of timetable.

We will revise (through the academic advisors) your documents and give feedback to the problem. Then, we send the necessary documents to the Office of Graduate Academic Affairs (OGAA) for approval.

5. Grading Criteria

Table III.1 Grading Criteria

CLASSIFICATION	SCALE 0 OF 100	SCALE 0 OF 4	LETTER GRADE
PASS			
Excellent	**90 ≤ GPA ≤ 100**	**4.00**	**A**
Very Good	**80 ≤ GPA < 90**	**3.75**	**A-**
Good	**70 ≤ GPA < 80**	**3.50**	**B+**
Fairly good	**60 ≤ GPA < 70**	**3.00**	**B**
Fair	**55 ≤ GPA < 60**	**2.50**	**C+**
Average	**50 ≤ GPA < 55**	**2.00**	**C**
FAIL			
Weak	**30 ≤ GPA < 50**	**1.30**	**D+**
Rather weak	**10 ≤ GPA < 30**	**1.00**	**D**
Too weak	**GPA < 10**	**0**	**F**

6. Specialization

Students are allowed to choose the specialization with appropriate courses.

- RF Design and Antenna
- Internet of Things
- Embedded Systems
- Signal Processing
- Wireless Communications
- Process Control and Automation
- Robotics
- Control Applications
- Computer Visions
- Artificial Intelligence

7. Graduation Criteria

Students must meet all of the following requirements for graduation:

- Fully complete the curriculum (60 credits) with GPA ≥ 50.
- Obtain the minimum English proficiency: TOEFL iBT score of 46; IELTS score of 5.5 overall; TOEIC (04 skills) score of Listening (400), Reading (385), Speaking (160) and Writing (150); Cambridge Exam (B2 First / B2 Business Vantage / Linguaskill).

8. Academic Dishonesty

The department expects each student to conduct him-/herself in a professional manner. Cheating offenses are reported to the appropriate academic office by the SEE without hesitation. An engineer beginning a career cannot afford to have this kind of incident on record. Both the student who gives information and the one who receives it are considered guilty parties.

The University policy on academic dishonesty is carefully spelled out in the undergraduate catalog. Note that copying from, or giving assistance to others, or using forbidden documents / materials on any exam or in any required report, is a violation. The recommended sanction is suspension from the University for one or more terms with a notation of academic disciplinary suspension placed on the student's transcript.

9. Academic Suspension

Any student who is in **one of the below cases** will be asked to suspense his/her study temporarily:

- The time limit for study is overdue.
- Dropping out university is more than one semester without the approval of the IU.
- Students have admonished more than 2 times.
- Students have not paid the tuition fees on time.

10. Student Organizations

Participation in Student Organizations is not only a nice way for you to practice your soft skills in any circumstances, but also to polish your skills, and expand your network. More information will be covered in your Orientation Day.

The Youth Union & Student Union of SEE

The EE Youth Union & EE Student Union have always been the connecting bridge between students in the school; provides various practical information to the students such as course registration schedules, scholarships, recruitment, seminars, summer internships, extracurricular activities as well as volunteer activities.

Student Clubs - Societies

IU has dozens student-run clubs, such as: Soft Skills Club (SSC), Social Work Team (SWT), English Club (EC), IU Buddy, etc. Through student clubs, you are going to have great opportunities to improve your competencies, widen your knowledge and soul. If you are interested in founding or joining a club or society, there are many ways the IU Office of Student Services (OSS) can help get your ideas to take off. Instructions on creating a new club & running your own event on campus can be found here: http://iuoss.com/

E-Tech Club is an official academic club belonging to the Electrical Engineering Youth Union. E-Tech Club is responsible for supporting students through the courses'

collective projects and the various school-wise academic competitions, help students utilizing their accumulated knowledge during the lecture hours and put into practice.

11. SEE Alumni

SEE Alumni keeps alumni in touch with news from SEE and from other alumni. The Alumni Group facilitates networking, social events, reunions, and aims to serve as a connecting bridge between generations of students. It does not matter where you are located or what you are doing, you are still part of our global alumni family and we would love to hear from you.

Currently, Dr. Vuong Quoc Bao is the president of our group.

Vuong, Quoc Bao

MEE Graduate
2017
Received Ph.D. in 2022
at Brest, France.

Since 2022 until now:
works at SEE-IU as
Assistant Professor.
Email:
vqbao@hcmiu.edu.vn

Pham, Trung Kien

MEE Graduate
2014
Received Ph.D. in 2016
at Rennes, France.

Since 2019 until now:
works at SEE-IU as
Assistant Professor.
Email:
ptkien@hcmiu.edu.vn

Huynh, Tan Quoc

MEE Graduate
2013
Received Ph.D. in 2019
at CUA, United States.

Since 2019 until now:
works at SEE-IU as
Assistant Professor.
Email:
htquoc@hcmiu.edu.vn

Please contact any group member through the provided email addresses for more details on job opportunities!

IV. COURSE DESCRIPTION

EE500

Research Methodology

This course is an integral part of the Master of Engineering degree program. Literature reviews, research planning, data analysis and reporting (written and oral) are essential attributes of all engineering disciplines. The main aim of this course is to provide the students with an opportunity to engage in these activities in a rigorous disciplined manner using a chosen engineering research topic.

EE505

Linear System and Random Process

The course teaches the fundamentals of probability, random variables, random processes, and linear systems. The course also demonstrates the application of random processes into linear systems and their analysis to solve real system problems.

EE511

Wireless Communications

This course is an introduction to Radio Propagation, Co-channel Interference, Spectral Efficiency and Power Efficiency, Diversity Schemes, Multiple Access Interference, Radio Resource Management, Performances of TDMA, CDMA and Wi-Fi Systems.

EE513

Data Communications and Networking

The course aims to help the learners to memorize the architecture of a computer network, explain how each device in a network communicates with each other and determine the routing of packets using different routing algorithms.

EE528

Advanced Telecommunications Networks

The course teaches the fundamental principles of data communication and networking, data transfer in telecommunication networks, error detection and correction techniques

in data link layer, multiple access (FDMA, TDMA, CDMA), wireless LANs, cellular telephone network, and innovation of cellular networks as well as their security.

EE530

Computational for Electromagnetics

The course emphasizes problem formulation, numerical techniques, and computer implementation. Team projects cover differential and integral equation-based computational electromagnetic methods in frequency and time domains.

EE531

Advanced Antenna Design

Selected topics from recent engineering literature on antennas; current techniques for analysis of wire, slot, horn, frequency-independent, quasi-optical, and array antennas. Electromagnetic solvers are used to design and simulate antenna.

EE532

Microwave Circuits and Measurement

The course focuses on the analysis and design of Radio Frequency circuits. It covers the design of passive and active RF circuits, including: impedance matching networks, RF filter design, power amplifier, mixers, RF Oscillator, low noise amplifier (LNA).

EE533

Monolithic Microwave Integrated Circuit

This course familiarizes graduate students with Monolithic Microwave Integrated Circuit (MMIC) design methodology and the CAD software that can be used in this process. The course covers Concepts and procedures to design a MMIC circuit, including instruction on processing, masks, simulation, layout, design rule checking, packaging.

EE534

Advanced Machine Learning and Artificial Intelligence (AI)

This course revises some fundamental machine learning concepts and introduce some advanced learning problems and algorithms in deep machine learning used in Artificial Intelligence. Basic concepts of data and data mining processes are mentioned in this course. Common program language used in the field of machine learning is introduced and implemented with some exercises.

EE535

Advanced Internet of Things

This course builds upon foundational knowledge of Internet of Things (IoT) and explores advanced topics in IoT technologies, architectures, and applications. Emphasis is placed on theoretical understanding, practical implementation, and critical analysis of IoT systems.

EE536

Advanced Robotics

This course introduces fundamental concepts in Robotics. Advanced concepts will be discussed, including coordinate transformation, kinematics, dynamics, equations of motion, feedback and feedforward control, and trajectory planning. Applying the theoretical knowledge to various motor systems, including manipulators, and mobile robotics.

EE540

Semiconductor Device Physics

Operational principles of canonical electronic devices are described in terms of material properties, equilibrium and non equilibrium processes, interface and junction characteristics, and device structure. Contemporary devices of interest to individual students will be explored through independent projects.

EE541

VLSI Design

Introduction to the design, modeling and testing various types of the Very-Large-Scale Integration (VLSI) in complex systems. Focuses on principles of fabrication the VLSI with methods, logic design, architecture, and design tools.

EE561

Advanced Digital Signal Processing

This is a continuing course of the undergraduate course in fundamental digital signal processing. Provides a review of digital signals and systems and introduces advanced topics in digital filter design on computers, effects of quantization, down- and up-sampling, adaptive and statistical signal processing

EE565

Digital and Embedded System Design

This course addresses the considerations in designing real-time embedded systems, both from a hardware and software perspective. The primary emphasis is on real-time processing for communications and signal processing systems. Programming projects in a high-level language like C/C++ will be an essential component of the course, as well as hardware design with modern design tools.

EE569

Digital Processing of Speech and Image Signal

The course aims at first to help the learners to understand basic image procedures such as point, arithmetic and geometric operations, histogram equalization, image scaling and compression, noise reduction, image restoration, edge and keypoint detection. Also, this course provides certain rudimentary understanding of multidimensional techniques for speech representation and classification methods.

EE580

Instrumentation and Sensors

This course introduces students to the state-of-the-art practice in electronic instrumentation systems, various types of sensor/transducer elements, their respective interface electronics, and precision measurement techniques. Students will be

familiarized with the principles and operations of some instruments and sensors as well as the techniques used in acquisition, processing, and presentation of sensor signals: transducers, Fourier analysis, flow measurement and bridge circuits.

EE582

Engineering Control Systems

This course explores popular control techniques applied to some engineering systems: Power electronics circuits, communication systems, and renewable energy systems. The standard theory of control is revised and the stability analysis of the system is also revisited.

EE591

Neural Network and Fuzzy Logics

This course exposes the student to the fundamental issues related to neural networks, some training techniques and fuzzy logic with applications to design an intelligent control system. The course also introduces some industrial applications.

EE592

Optimal Control

This course explores the principles and methods of the optimal approach for controlling dynamic state-space systems (both linear and non-linear) in both noise-free and noisy environments. The theory of differential and integral equations of higher degrees is covered.

EE594

Fault Diagnostic and System Identification

This course covers the theory and application of fault diagnosis in multi-domain dynamic systems. Knowledge of concepts such as system stability, controllability, and observability is essential. Linear system theory or a control course based on state-space concepts is required. Other techniques focusing on system identification are also covered in this course.

EE595

Applied Control Engineering

This course will introduce students to key topics of new and recent technologies within Internet of Things (IoT), 5G Mobile, and Recently advanced Control Theory through the combination of theoretical contents and practical applications.

EE596

Advanced Theory of Automatic Control

This course focuses on an in-depth knowledge of linear control systems-based on advanced control techniques used in modern control engineering research and industrial applications. Design, analysis and implementation of advanced controllers or control laws will be covered and will be illustrated by some relevant examples.

EE597

Advanced PC Based Control and SCADA System

PC-Based Control and SCADA system course provide students with knowledge of implementing control and measurement using PC, A/D, D/A converters, peripheral devices, the electronics that go along with sensors to refine and condition their outputs. The knowledge of Supervisory Control And Data Acquisition (SCADA) system as well as the SCADA commercial software will be included.

EE604

Research Project

In the field of Electrical Engineering, the research project focuses on solving difficulties encountered in practice as well as addressing safety issues and ethics. The research project provides the students an integrated understanding of scientific practice and principles in the identify and solving engineering problems. Furthermore, the research project combines many aspects of engineering as each student must demonstrate his/her knowledge in several areas, including automation, control, embedded systems, RF and microwave technique, and communication systems.

EE605IU

Thesis

The thesis is designed to provide students with the opportunity to conduct independent research under the supervision of a faculty advisor. Students will select a topic within the field of electrical engineering, formulate research questions, design experiments, gather and analyze data, and present their findings in a written thesis and oral defense.

EE611

Internship

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.

EE612

Graduation Project

This course is intended for Master's level students. Students will work with their advisor to create a Master's graduation project related to the EE field. In addition to the accumulation of theoretical knowledge, the graduation project requires solving difficulties encountered in practice as well as addressing safety issues and ethics. The graduation project provides the students an integrated understanding of scientific practice and principles in the identify and solving engineering problems.