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# WELCOME TO SCHOOL OF ELECTRICAL ENGINEERING (SEE)

## 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.

## 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.

## 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.

## 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.

# 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 45 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 to 04 courses - 06 to 12 credits)
3. Elective Courses (02 to 06 courses - 06 to 18 credits)
4. Thesis module (01 to 03 courses - 12 to 30 credits)

## 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 2 | 3 | 4.64 |
| EE500 | Research Methodology | 2 | 3.09 |  |  |  |  |
| EE505 | Linear System  and Random Process | 4 | 6.18 |  |  |  |  |
| EExxx | Elective  Course 1 | 3 | 4.64 |  |  |  |  |
| EE602 | Thesis module  (Research Proposal) |  |  | EE602 | Thesis module  (Research  Part I) |  |  |
| **Total** | | **12** | **18.56** | **Total** | | **3** | **4.64** |
| **The Second Year** | | | | | | | |
| **Semester 1** | | | | | | **Credit** | **ECTS** |
| EE602 | Thesis module  (Thesis) | | | | | 30 | 46.4 |

**Note:** The thesis module includes three parts, which adds up to 30 credits in total.

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 2 COURSES)** | | **6** |
| 1 | EE511 | Wireless Communications | 3 |
| 2 | EE512 | Information and Coding Theory | 3 |
| 3 | EE513 | Data Communications and Networking | 3 |
| 4 | EE530 | Computational for Electromagnetics | 3 |
| 5 | EE531 | Advanced Antenna Design | 3 |
| 6 | EE532 | Microwave Circuits and Measurement | 3 |
| 7 | EE533 | Monolithic Microwave Integrated Circuit Design | 3 |
| 8 | EE540 | Semiconductor Device Physics | 3 |
| 9 | EE541 | VLSI Design | 3 |
| 10 | EE542 | Micro-Electro-Mechanical System | 3 |
| 11 | EE544 | Analog IC Design | 3 |
| 12 | EE561 | Advanced Digital Signal Processing | 3 |
| 13 | EE562 | Data Compression | 3 |
| 14 | EE569 | Digital Processing of Speech and Image Signal | 3 |
| 15 | EE580 | Instrumentation and Sensors | 3 |
| 16 | EE582 | Engineering Control Systems | 3 |
| 17 | EE583 | EM Interaction with Biological Tissues | 3 |
| 18 | EE591 | Neural Network and Fuzzy Control | 3 |
| 19 | EE592 | Vision Control | 3 |
| 20 | EE593 | Optimal Control | 3 |
| 21 | EE594 | Fault Diagnostic and System Identification | 3 |
| 22 | EE595 | Applied Control Engineering | 3 |
| **IV** | **THESIS MODULE** | | **30** |
| 1 | EE602 | Research Proposal | 30 |
| Research Part I |
| Thesis |
| **TOTAL** | | | **45** |

## 

## 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 1 | 3 | 4.64 |
| EE500 | Research Methodology | 2 | 3.09 | EExxx | Elective  Course 2 | 3 | 4.64 |
| EE505 | Linear System  and Random Process | 4 | 6.18 | EExxx | Elective  Course 3 | 3 | 4.64 |
| EE531 | Advanced Antenna Design | 3 | 4.64 | EExxx | Elective  Course 4 | 3 | 4.64 |
| EE595 | Neural Network and Fuzzy Control | 3 | 4.64 | EExxx | Elective  Course 5 | 3 | 4.64 |
| **Total** | | **15** | **23.19** | **Total** | | **15** | **23.2** |
| **The Second Year** | | | | | | | |
| **Semester 1** | | | | | | **Credit** | **ECTS** |
| EExxx | Elective Course 6 | | | | | 3 | 4.64 |
| EE603 | Thesis | | | | | 12 | 18.56 |
| **Total** | | | | | | **15** | **23.2** |

Table II.4 List of Courses for Coursework Program

|  |  |  |  |
| --- | --- | --- | --- |
| **No.** | **Course ID** | **Course Names** | **Number of credits** |
| **I** | **GENERAL COURSES** | | **3** |
| 1 | PE505 | Philosophy | 3 |
| **II** | **FUNDAMENTAL COURSES** | | **12** |
| 1 | EE500 | Research Methodology | 2 |
| 2 | EE505 | Linear System and Random Process | 4 |
| 3 | EE531 | Advanced Antenna Design | 3 |
| 4 | EE595 | Neural Network and Fuzzy Control | 3 |
| **III** | **ELECTIVE COURSES (CHOOSE 6 COURSES)** | | **18** |
| 1 | EE511 | Wireless Communications | 3 |
| 2 | EE512 | Information and Coding Theory | 3 |
| 3 | EE513 | Data Communications and Networking | 3 |
| 4 | EE530 | Computational for Electromagnetics | 3 |
| 5 | EE532 | Microwave Circuits and Measurement | 3 |
| 6 | EE533 | Monolithic Microwave Integrated Circuit Design | 3 |
| 7 | EE540 | Semiconductor Device Physics | 3 |
| 8 | EE541 | VLSI Design | 3 |
| 9 | EE542 | Micro-Electro-Mechanical System | 3 |
| 10 | EE544 | Analog IC Design | 3 |
| 11 | EE561 | Advanced Digital Signal Processing | 3 |
| 12 | EE562 | Data Compression | 3 |
| 13 | EE569 | Digital Processing of Speech and Image Signal | 3 |
| 14 | EE580 | Instrumentation and Sensors | 3 |
| 15 | EE582 | Engineering Control Systems | 3 |
| 16 | EE583 | EM Interaction with Biological Tissues | 3 |
| 17 | EE592 | Vision Control | 3 |
| 18 | EE593 | Optimal Control | 3 |
| 19 | EE594 | Fault Diagnostic and System Identification | 3 |
| 20 | EE595 | Applied Control Engineering | 3 |
| **IV** | **THESIS** | | 12 |
| 1 | EE603 | Thesis | 12 |
| **TOTAL** | | | **45** |

# ACADEMIC MATTERS

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

## 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](mailto:ptkien@hcmiu.edu.vn))

## 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

## 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//](https://hcmiu.edu.vn/edusoftweb/) (*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.

## 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.

## 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** |

## 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

## Graduation Criteria

Students of the **Research Program** must meet all of the following requirements for graduation:

* Fully complete the curriculum (45 credits) with GPA ≥ 50.
* Being an author or a coauthor of at least one scientific paper published in an international journal according to Web of Science (WoS)/Scopus.
* Obtain the minimum English proficiency: TOEFL iBT score of 61; IELTS score of 6.0 overall; VNU-EPT of 276.

Students of the **Coursework Program** must meet all of the following requirements for graduation:

* Fully complete the curriculum (45 credits) with GPA ≥ 50.
* Obtain the minimum English proficiency: TOEFL iBT score of 61; IELTS score of 6.0 overall; VNU-EPT of 276.

## 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.

## 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.

## 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.

## 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. Pham Trung Kien is the president of our group.

|  |  |
| --- | --- |
|  |  |
| **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](mailto: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](mailto:htquoc@hcmiu.edu.vn) |

# 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.

**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.

**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.

**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.

**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.