**Purdue University**
**Master's Program Handbook**
**Electrical and Computer Engineering**
**Purdue School of Engineering Technology**
**Indiana University. Purdue University. Indianapolis**

*Rev.* Summer 2022

# 1 Introduction

This handbook contains the requirements and regulations for the Master's degree programs offered by the Department of Electrical and Computer Engineering (ECE) at Indiana University Purdue University Indianapolis (IUPUI). Included is information about the types of Master's degrees, degree requirements, minimum academic standards, the advisory committee, plan of study (POS), registration, and the Master's thesis.

Our engineering degree programs are administered jointly by IUPUI and Purdue University at West Lafayette. Your degree is granted by Purdue University upon successful completion of all degree requirements in the Department of Electrical and Computer Engineering at IUPUI. The Purdue School of Engineering and Technology Office of Graduate Programs works closely with the Purdue University Graduate School in West Lafayette as well as with the IUPUI Graduate Office in a campus-wide coordination and administration of graduate engineering programs. Additionally, if you are an international student, you will have contacts with the Office of International Affairs at IUPUI regarding visas and immigration requirements.

A strength of the academic component of the Master's program is that each student creates his/her own plan of study (POS), a document that defines the student's academic program. The degree requirements, which have elements of depth and breadth, afford flexibility for developing a POS that best suits your needs and goals. The information in this handbook is intended to assist you in setting up your POS and advisory committee. In developing your POS, you should consult with your advisory committee, in particular your major advisor. Your POS requires the approval of all advisory committee members, as well as the approval of the ECE Graduate Committee, and the Graduate School.

Students in the Master's program must identify an ECE primary area from the four defined areas: Automatic Control, Robotics, Power and System (AC); Communication and Signal Processing (CS); Computer Engineering (CE); and VLSI and Circuit Design (VC). Within the ECE graduate program, the primary area is defined as the one of the above four areas closest to your interests or thesis research. Courses outside of your primary area are to be considered as part of one or more related areas. On your plan of study, the courses are to be identified as belonging to either the ECE primary or ECE related areas.

In addition to this handbook, there are other resources available in the Graduate School Office and the ECE Office, as well as on the ECE Graduate website [1].

# 2 Master's Degrees

The Department of Electrical and Computer Engineering offers the following Master's degrees:

- Master of Science in Electrical and Computer Engineering (MSECE)

:

[1] http://et.engr.iupui.edu/departments/ece/grad

**The MSECE degree** is awarded to students who satisfy the requirements of the ECE program and any one of the following conditions:

- An undergraduate degree in CmpE, ECE, or EE from an ABET accredited institution.
- An undergraduate degree in Computer Science, if the student's course work includes junior or senior level courses in a) operating systems, b) compiling, and c) computer architecture. Prerequisite material for these courses is implicitly required.
- Any other undergraduate degree, plus satisfaction of a specified set of ECE undergraduate requirements. Refer to Appendix A for the detailed description of ECE undergraduate requirements.

## 2.1 Thesis or Non-thesis Options

Either the thesis or non-thesis option must be selected for the ECE and the interdisciplinary program. Requirements for both options are summarized in Table 1, and the detailed requirements are described in Section 3. The ECE department strongly recommends full-time students select the thesis option in order to be considered for financial aid and assistantships.

|  | Thesis Option | Non-thesis Option |
|---|---|---|
| ECE Core Courses | At least 6 cr hrs | |
| Math *See Appendix F* | At least 3 cr hrs | |
| Primary Area | At least 15 cr hrs | |
| Masters Thesis | 9 hrs of ECE 69800 | NONE |
| Project | NONE | At most 3 hrs of ECE 69600 |
| Total | A total of 30 hrs | |

Table 1: Summary of Thesis and Non-thesis Options

# 3 Degree Requirements

## 3.1 Total and ECE Graduate-Level Credit Hours

All students must complete a total of 30 credit hours selected by the student and approved by the advisory committee. The requirements are the same for all MS degrees, at least 15 credit hours must be ECE graduate courses. One 3 credit hour course from the list in Appendix B is required to meet the Mathematics requirement, see Section 3.4). No more than 3 additional credit hours can be taken outside of the ECE department (see Section 6.3) that can be used on your MSECE plan of study. Pass/No-Pass grades are not permitted for courses on the Master's plan of study.

## 3.2 Breadth Requirement

The area core courses cover introductory material essential to the respective ECE research area. Students must successfully complete a minimum of two (2) core courses from ECE 600, ECE 602, ECE 604, ECE 606, ECE 608, and ECE 610 to ensure a limited breadth of knowledge within the program. A student must select the core course for their declared ECE primary area. The primary area will be chosen from one of the four defined areas listed in Table 2. The third column of the table indicates the core courses associated with each primary area. Note at this time IUPUI does not offer ECE 604 and ECE 606. Note All grades that are used to satisfy the breadth requirement (core courses) must be C or higher and their average must be a C+

Table 2: Primary Areas within ECE and the core course associated with it.

| Primary Area | Abbr. | Core Course |
|---|---|---|
| Automatic Control, System and Power | AC | ECE 60200 |
| Communication and Signal Processing | CS | ECE 60000 |
| Computer Engineering | CE | ECE 60800 |
| VLSI and Circuit Design | VC | ECE 60600/ECE 60800 |

Only courses offered from Indianapolis or West Lafayette campuses can be used to satisfy the breadth requirement. Regional campus courses and transfer courses must not be used toward the breadth (core course) requirement

## 3.3   Depth Requirement

Students must successfully complete at least fifteen (15) credit hrs in the primary area they have declared. The core course in their primary area and thesis credits (if thesis option is selected) can be applied towards this requirement. Appendix F details the list of courses in each primary area.

## 3.4   Math Content Course Requirement

A minimum of three (3) approved math-oriented course credit hours is required for all degree programs. The approved mathematics, statistics, electrical & computer engineering, computer science, and physics courses meeting the math requirement are given in Appendix B. Note the course used to meet the Math Requirement cannot also be used to satisfy the Breadth Requirement.

## 3.5   Options

The ECE department offers two options for the MSECE degree

**A.   non-thesis option** All 30 graduate credits will be generated from coursework.

**B.   thesis option** Nine of the 30 graduate credits will be thesis credits (see Research Opportunity). The remaining 21 graduate credits will come from coursework.

## 3.6   Research

Research is not required for the Master's degree, but is highly encouraged. There are research opportunities for both the thesis and non-thesis options.

**A.   non-thesis option** Research credit hours are not required for students on non-thesis option. However, a maximum of three (3) credit hours of ECE 69600 (Advanced Projects) or ECE 69311 (Internship) are allowed on their plan of study for the non-thesis option. One enrolls in the 69600 courses under an ECE faculty. Students should approach the faculty to see if faculty has a project available. To formally enroll in one of these courses, see the ECE Graduate Program Coordinator (Sherrie Tucker at ecegrad@iupui.edu), for the requirements.  The course ECE 69800 is not allowed on the POS of students pursuing the non-thesis option, and ECE 69800 will not be converted to ECE 69600.

**B.   thesis option**  Students pursuing the thesis option are required to register for a minimum[1] of 9 credit hrs of ECE 69800 Research (thesis) toward their MS degree. Students are required to take 21 credit hrs of courses. One enrolls in the 69800 courses under an ECE faculty. Students should approach faculty to identify thesis topic. They will register for 69800 credits hours under that faculty. On a per semester basis, students should check with their thesis mentor (major professor) to determine the number of ECE 69800 credit hours to take per semester. ECE 69800 credit hours qualify as ECE graduate-level credit hours and may be used to satisfy the ECE depth requirement as described in Section 3.1. ECE 69600 credit hours are not allowed on the POS of students pursuing the thesis option. To enroll in this course, see the ECE Graduate Program Coordinator (Sherrie Tucker ecegrad@iupui.edu), for the form, to request permission. The course ECE 69800 is not allowed on the POS of students pursuing the non-thesis option, and ECE 69800 will not be converted to ECE 69600.

---

[1] Except in the case thesis student has complete one internship credit.

## 3.7 Internship

All ECE graduate students can pursue internships. One can earn course credit with an engineering internship (once approved) via the course **ECE 69311**. This is a variable credit course (1 to 3 credits)

**Non-thesis:** students may take up to (3) credits of ECE 69311 Internship to count toward their POS. Note that on a non-thesis POS the sum of the number of credits of 69311 and the number of credits from 69600 can be at most 3 credit hours

**Thesis:** students may take at most 1 credit of ECE 69311 Internship. In the case of a thesis student they can use credit of 69311 and 8 credits of 69800 on their POS. That is, the nine credit thesis requirement can be satisfied by 1 credit internship credit and 8 credits of 69800.

See the ECE Graduate Program Coordinator (Sherrie Tucker ecegrad@iupui.edu), for the form, to request permission for 69311 credit.

## 3.8 Minimum Academic Requirements

**Good Academic Standing.** The ECE Department maintains the following minimum standards to be in *good aca- demic standing* in the Master's degree program.

To be in good academic standing, a Master's graduate student must maintain a cumulative grade point index of at least 3.00 out of 4.00 over the graduate courses they have taken as graduate student, as well maintain at least a 3.0 semester GPA on graduate courses taken each semester. A graduate student who is not in good academic standing at the end of any semester or summer session maybe given an academic warning and/or placed on probation. Decisions concerning probation/academic warning are made by the ECE Graduate Committee. A student on probation may not be permitted to register for further graduate courses, pending academic review and approval by the ECE Graduate Committee.

The cumulative grade point index used for the plan of study (POS) is calculated using the courses that are on the POS. If a course is taken more than once while the student is enrolled as a graduate student, only the most recent grade received in the course will be used in computing the grade point index. Transfer courses are not included in the computation of the cumulative grade point average. University requirements state that no grade below 'C-' is allowed for a course that is on the approved POS. All Master's students must achieve a final cumulative grade point index of 3.00 or higher for courses that are on the POS. Any course on the POS for which a grade of 'D' or 'F' is obtained must be repeated. In the event of a deficiency in the cumulative grade point index, a course may be repeated but only the most recent grade received will be used in computing the index.

**Note:** All grades that satisfy the breadth requirement (core courses) must be C or higher and students must average C+ on their breadth requirement courses.

## 3.9 English Requirement

All ECE graduate students must demonstrate acceptable proficiency in written English before graduating. Students will not be allowed to graduate until this requirement has been met.

The Graduate School requires the English requirement be completed as early as possible (first semester) in their academic program. The English proficiency requirements are detailed in Appendix C.

All teaching assistants must satisfy additional oral English proficiency.

## 3.10 Residency and Load Requirement

### 3.10.1 Semester Load

All international students must be enrolled full-time to maintain appropriate visa status. To qualify as a full-time student, a student must satisfy one of the following criteria:

- be enrolled for a minimum of eight (8) credit hours, or
- hold a research or graduate assistantship and be registered for at least six (6) credit hours.

### 3.10.2 Residency Requirements

The total number of hours of academic credit used to satisfy residency requirements consists of all course credit hours that appear on the plan of study, other graduate course credit hours on the IUPUI transcript with grades of 'B' or better, and

thesis research hours that appear on the transcript. At least one-half of the total credit hours used to satisfy degree requirements must be earned in residence on the IUPUI campus, where the degree is to be granted. Course credits obtained via televised instruction on the IUPUI campus shall meet the residency requirement.

# 4   Master's Plan of Study (Non thesis)

The Master's advisory committee shall consist of one ECE faculty member: Dr. Brian King (ECE Dept. chair).

# 5   Master's Advisory Committee (thesis)

The Master's Advisory Committee shall consist of a minimum of three faculty members. The duties of this committee are to assist the student in the preparation of the plan of study, advise the student on research related to the Master's thesis, and conduct examinations on the Master's thesis. The student shall select a major Professor who will serve as the Chair of the advisory committee. The major professor/student relationship must be a mutually acceptable one. With the advice and approval of the major professor, the student will select the remaining members of the advisory committee. The Chair of ECE Graduate Program may serve as the major professor for a student with a non-thesis option or for a new coming student by default. The following rules and guidelines will help you to select your advisory committee:

1. The major professor must be a member of the ECE faculty and should be a member of the primary area that the student has declared. Refer to Appendix D for the list of faculty and their areas.
2. At least one member of the advisory committee must be from the student's primary area, and another member should be from the ECE Related Area.
3. If you have selected the thesis option and two advisors guide your research jointly, it may be advisable to have two co-chairs on your advisory committee rather than a single chair. At least one of these co-chairs must be a member of the ECE faculty and should be a member of the primary area that you have declared.
4. A majority of your advisory committee must be composed of members of the ECE faculty.
5. A special member, defined as a person without regular certification, may be added as the fourth member of the committee.
6. Faculty members from other universities, researchers from industry, and non-faculty research staff from the campus have to be approved for special certification by the Graduate School for them to be members of the advisory committee. A student may initiate a request for special certification in the ECE Graduate Office. A current and complete vita for the special member has to be submitted along with the request.

The advisory committee, as agreed upon by the student and the major professor, shall be presented to the ECE Graduate Office and the Dean of the Graduate School for approval and formal appointment. The Dean may appoint additional members if it seems advisable. The advisory committee is established when the plan of study is approved. Changes to the advisory committee require a 'Change in Plan of Study' form GS-13 to be completed.

# 6   Master's Plan of Study

All Master's students must file a preliminary plan of study (POS) *before the end of their first semester*. This should be done when you meet with your adviser prior to the beginning of your second semester. This requirement helps to ensure a clear academic course plan by the student, sets a clear pathway toward completion of the student's degree, and helps the school plan and monitor the overall ECE graduate program. For this reason, registration for subsequent semesters can be restricted by the ECE Graduate Committee until the plan of study has been filed. If necessary, changes can be made to the plan of study at a later date, subject to the restrictions cited in Section 6.1. The plan must be appropriate to meet the needs of the student's chosen field as determined by the advisory committee and must be approved by the ECE Graduate Program and the Graduate School.  Electronic instructions concerning filing the official POS will be emailed to you.

## 6.1   Changing Your Plan of Study

It is recognized that as a student's program progresses there may arise conditions that make it desirable to change the program or the plan of study. Indeed, such changes, when based on sound academic reasons, are allowed. However, there are regulations to be observed for the change. Specifically, A course may not be removed from an approved plan of study once the course has been taken and a grade of 'D+' or lower is received. This is a Graduate School rule. Refer to Appendix E for the approval process of the plan of study.

Any change/s to a plan of study requires approval of the student's advisory committee and the ECE Graduate Program. To make changes to an approved plan of study, mypurdue.purdue.edu 'Request for Change to the Plan of Study' has to be completed and electronically filed to the Graduate School. This form is also used to request a change of major professor and/or other advisory committee members, or for a change of the Master's degree option.

All graduate forms are electronic. Your IUPUI email is considered an official manner of communicating to you. The ECE graduate program coordinator will notify students via email about the procedure of completing the electronic POS. The ECE department suggests you complete the POS and submit for approval approximately one year before you expect to graduate. See ECE Graduate Coordinator for assistance, email ecegrad@iupui.edu

## 6.2 Undergraduate, Transfer, and Excess Course Credits

### 6.2.1 Transfer Credits

A maximum of twelve (12) graduate-level credit hours earned at an accredited university may be applied toward the Master's degree and entered on the Master's plan of study. All courses transferred are subject to review for appropriateness and approval by the ECE Graduate Program.

Such courses must be graduate-level courses, must not have been used to meet the requirements for another degree, must be completed with a grade of 'B' or better. Grades from transfer courses are not included in computing the grade point average.

### 6.2.2 Excess Course Credits

Up to twelve (12) credit hours of graduate-level courses taken before a student was admitted to the ECE Master's program may be applied toward the Master's degree and entered on the Master's plan of study. Allowed courses include those taken:

1. as excess undergraduate-degree credit taken at senior-year standing;
2. in non-degree status;
3. while seeking a degree in other departments or schools, if you subsequently request to transfer to ECE;
4. while seeking a degree in other departments or schools, if you subsequently request dual-degree status in ECE. For dual-degree students seeking a PhD in another department or school and a Master's degree in ECE, the ECE Master's degree plan of study may not contain any courses offered by or dual-listed with the student's other department or school.

Again, the ECE graduate committee will decide if these courses are appropriate for use on our MSECE POS. A grade of B or better on the course(s) will be required for consideration.

### 6.2.3 Special Approval Requirements

Without exception, all transfer, and excess course credits used on the Master's plan of study must be approved by your advisory committee and by the ECE Graduate Program. The steps to follow in requesting approval to include such credits on the Master's plan of study are:

1. Add the course to your plan of study.
2. If a transfer course or a non-ECE course was taken at other universities, show a copy of the catalog description of the course to your advisory committee members and bring the catalog description to the ECE Graduate Office.
3. If you are transferring a course from another university, the ECE Graduate Program will also require an original transcript showing the grade earned and a statement from an official at the university where the course was taken certifying that the course was not used to fulfill requirements for any other degree.

## 6.3 Credits taken outside the ECE Department

One 3 credit Mathematics content course must be chosen from the list in Appendix B for the plan of study in order to satisfy the Mathematics requirement (see Section 3.4). Only 3 additional credits, taken from another department can be counted on the plan of study. These credits can be selected from the list in Appendix B, or the credit selection (i.e. course) must be approved by both your advisory committee and by the ECE Graduate Program, this approval *must be obtained prior* to taking the course. Whenever one takes a course outside the ECE department, with the exception of a Mathematics course that is used to satisfy the math content requirement, one needs to get approval for appropriateness. One must complete the **ECE Graduate Course Outside Department Approval Form**, forms are available in the ECE Graduate office in SL 160, see the ECE Graduate Program Coordinator Sherrie Tucker (ecegrad@iupui.edu).

# 7   Registration

The registration period begins during the third week of October for the Spring semester and during the third week of March for the Summer sessions and Fall semester. Watch for announcements on registration as these dates approach. All current ECE graduate students must register during this registration period (October-November and March-April). Note that late registration incurs a penalty fee. We encourage you to select your courses and register early, as department's decisions to cancel courses that have low enrollment may affect your course options.

**Dropping and Adding Courses.** Be aware of registration procedures, late fee charges, and refund deadlines for dropping and adding of courses. Students may drop/add courses on-line during the open registration period. However, once the Open Registration period ends, on-line registration will not be available, and students must use a late the E Drop/Add thru one.iu to change a course. Information on procedures and deadlines are available on the Registrar's website [3].

**Inactive Academic Status.** Students who do not enroll in classes or skip (1) semester, must submit a request to the ECE Graduate coordinator to be term activated. Students who do not enroll in classes for three (3) consecutive academic sessions, this includes summer session, will be automatically placed into inactive academic status. Students who have been placed in inactive academic status are required to apply for and be granted re-admission to the graduate program before they are permitted to enroll again. The application process for readmission consists of completing and submitting a new application, other supporting application materials are not required for re-admission. Students who skip (1) semester, will need to request to be "term activated "contact the ECE graduate coordinator. Include your full name and student ID in your request. Students must wait for their applications for re-admission to be officially approved by the Purdue University Graduate School before enrolling for classes. Registration activities that take place while in the inactive academic status and before a new application for re-admission has been officially approved by the Graduate School are considered invalid registrations and will not count toward graduate credit.

# 8    Master's Thesis and Final Examination

For those pursuing the thesis option, a thesis must be prepared according to a preset format using LaTeX[4] (OVERLEAF) and processed (revised, signatures obtained, bound, distributed) following specified procedures. Likewise, the student must present and defend his/her work in a Final Examination. Information relative to the preparation and processing of the thesis is contained in Appendix D. Appendix E outlines the steps involved in scheduling the final examination.

# 9    Petitions to the Graduate Committee

All graduate students have the right to petition for exceptions to any existing rules if they feel that the circumstances are sufficiently unusual to warrant special consideration. The petition should be delivered in writing to the Head of the ECE Graduate Program and should contain the approval (or disapproval) of each member of the student's advisory committee.

---

[3] http://registrar.iupui.edu

[4] Guidance in using LaTeX will be provided and tools such as Overleaf make it easy to write your document using LaTeX

# A    Undergraduate Course Requirement

This appendix describes undergraduate course requirements for the MSECE degree program to qualify a BS major other than CmpE, ECE, and EE.

## A.1    Courses Required

Graduates from non-ABET accredited programs or graduates of non-engineering majors, including technology and science programs, may complete and be awarded the Master of Science in Electrical and Computer Engineering degree (MSECE) if the following undergraduate course requirements are fulfilled, in addition to completing the Master's degree requirements:

- ECE 201, ECE 264, ECE 301, ECE 302,
- One of ECE 305 and ECE 311, ECE 408
- Two of ECE 255, ECE 270, ECE 321, and ECE 382,
- One of ECE 362, ECE 359, and ECE 365; and
- One undergraduate lab of ECE 207, ECE 208, and ECE 282.

Graduates from Computer Science discipline may be asked to take either ECE 301 or ECE 302. The engineering courses listed above require the following math and/or science prerequisites or equivalents:

| | |
|---|---|
| MATH 165 | Analytic Geometry and Calculus I |
| MATH 166 | Analytic Geometry and Calculus II |
| MATH 171 | Multidimensional Mathematics |
| MATH 261 | Multivariate Calculus |
| MATH 266 | Differential Equations |
| PHYS 251 | Heat, Electricity, and Optics |

## A.2    Ways to Fulfill the Requirements

The "Undergraduate Requirements" are administered by the ECE department and the Graduate Programs Office. A student may fulfill the requirements for an undergraduate electrical and computer engineering course through the following ways:

1. Taking the indicated course and receiving a grade of 'B' or better.
2. For a course offering a comprehensive final exam, taking the final exam for the course and ranking in the top 30% of the class taking the exam. (This is available only to students who are not enrolled in the course.)
3. Establishing that s/he had obtained a grade of 'B' or better in an equivalent course.
4. Taking a closely related Electrical and Computer Engineering graduate course such as
   ECE 201/ECE 554, ECE 270/ECE 559, ECE 301/ECE 538, ECE 302/ECE 600, ECE 305/ECE 606, ECE 311/ECE 604, ECE 359/ECE 608, ECE 365/ECE 565, ECE 408/ECE 595-RTOS, ECE 382/ECE 602, and ECE Lab/ECE 557, receiving a grade of 'B' or better.

Note that the purpose of the undergraduate requirements is to give substance to the claim that the person receiving the MSECE does indeed have an electrical and computer engineering background. The requirements are not related to the prerequisites for graduate courses.

# B    Mathematics Requirement

The following list of courses have been approved for meeting the mathematics requirement.

## B.1    Mathematics Courses

Courses numbered MATH 511 and above are acceptable with the exceptions listed below:

1. MATH 519 (STAT 519) is *not* acceptable due to significant overlap with ECE 600
2. MATH 504 is acceptable for students whose primary area is either Automatic Controls or Communications and Signal Processing.
3. MATH 527 is *not* acceptable for Communications and Signal Processing majors.
4. Math education related courses are not acceptable.

## B.2    Electrical & Computer Engineering Courses

**ECE 580** Optimization Methods for Systems & Control
**ECE 53901** Foundations of Advanced Engineering I
**ECE 600** Random Variables *Note: To use ECE 600 as Math content you must have three core classes on POS*
**ECE 695** Error Correction Codes (Error Control Coding)

## B.3    Computer Science Courses

**CSCI 514** Numerical Analysis
**CSCI 515** Numerical Analysis of Linear Systems
**CSCI 520** Computational Methods in Analysis
**CSCI 614** Numerical Solution of Ordinary Differential Equations
**CSCI 615** Numerical Solution of Partial Differential Equations

## B.4    Statistics Courses

**STAT 528** Introduction to Mathematical Statistics
**STAT 529** Applied Decision Theory and Bayesian Statistics
**STAT 532 (MATH 532)** Elements of Stochastic Processes
**STAT 533** Non-Parametric Statistics
**STAT 538 (MATH 538)** Probability Theory I
**STAT 539 (MATH 539)** Probability Theory II
**STAT 553** Theory of Linear Models and Experimental Designs
**STAT 554** Multivariate Test Statistics
**STAT 555** Non-Parametric Statistics
**STAT 576** Introduction to Statistical Decision Theory
**STAT 638** (MATH 638) Stochastic Processes I
**STAT 639** (MATH 639) Stochastic Processes II
**STAT 657** Theory of Tests, Estimation and Decisions I
**STAT 658** Theory of Tests, Estimation and Decisions II
**STAT 667** Measure-Theoretic Statistics: Decision Theoretic and Classical
**STAT 668** Asymptotic Distribution Theory

## B.5    Physics Courses

**PHYS 600** Methods of Theoretical Physics I
**PHYS 601** Methods of Theoretical Physics II

Please Note: Faculty-initiated requests for changes or exceptions to the above will be considered by the Graduate Committee after approval by the appropriate area. Student-initiated requests must follow the same procedure, with the additional first step of approval by the student's major adviser.

## C  English Language Proficiency Requirements

### C.1  English as a Second Language (ESL) Requirements

All graduate degree-seeking international students whose English is not their first language must take the English Placement Test (English language proficiency examination) administered by the IUPUI English as a Second Language (ESL) Program before they are permitted to enroll for classes after admission.

Exemption from taking this course:  Students who scores IELTS 7.0 or higher, TOEFL 100+ or higher.

Students tested with English language deficiencies are required to take all of the remedial courses determined by the ESL placements and receive passing grades on those courses. Students must begin taking the first ESL course in the first semester of enrollment and complete the requirements in sequence before graduation. Students with incomplete ESL requirements will not be approved for graduation.

SPEAK Test for International Graduate Teaching Assistants

All non-native speakers of English must be tested for their oral English proficiency before they are assigned duties that involve direct student contact (teaching assistant, laboratory assistant, graders, and tutors). Students must take and pass the SPEAK Test, a nationally standardized test before the students are given an academic appointment. Students who failed to obtain the required minimum scores will need to take an ESL course, G520 "Communication Skills for International Teaching Assistants" (3 credit hours) and take the test again before they can accept their appointments.

## D  ECE Graduate Faculty

Note the following abbreviation for primary areas: Automatic Control, Robotics and System (AC); Communication and Signal Processing (CS); Computer Engineering (CE); and VLSI and Circuit Design (VC). The chair of your POS committee must be one of the ECE faculty given below.

Regular Graduate Appointment

| Name | Identifiers | Area |
|------|-------------|------|
| Zina Ben Miled | X0360 | CE |
| Yaobin Chen | X0225 | AC |
| Yung Ping Stanley Chien | X0224 | CE |
| Lauren Christopher | X0565 | CS, VC |
| Euzelli dos Santos | X0704 | AC |
| Mohamed El-Sharkawy | X0260 | CS, CE |
| Dongsoo (Stephen) Kim | X0390 | CS, CE |
| Brian King | X0412 | CS, CE |
| Sarah Koskie | X0430 | AC |
| John Lee | X0480 | CE, VC |
| Lingxi Li | X0564 | AC |
| Steven Rovnyak | X0425 | AC |
| Maher E. Rizkalla | X0191 | VC |
| David Russomanno | X0640 | CE |
| Peter Schubert | X0684 | AC, VC |
| Paul Salama | X0369 | CS, CE |
| Zhang, Qingxue | X0882 | CS,CE |

## E  Master's Degree Milestones

The following are "milestones" that should be used as a guide to accomplish needed tasks to complete the degree requirement:

- Prior to First Semester Registration:

- Schedule an advising appointment with your initial graduate adviser regarding possible courses to take.
- If necessary, contact ECE Graduate Program (SL 160), ECE Graduate Committee chair, and/or chair of the department for assistance with registration. ecegrad@iupui.edu

- During the First Semester:
    - Satisfy conditions for admission and/or English proficiency requirements, if relevant.
    - Decide if you will opt for thesis option or non-thesis option.
    - Select major professor (adviser) and advisory committee
    - Prepare the preliminary master's plan of study and submit the plan prior to registration for the second semester.
    - In the fourth month of your first semester, please schedule an advising appointment to take place prior to your second semester.

- One Semester Prior to the Final Semester of Graduation:
    - Fill out an electronic "Application for Graduation" form before the beginning of the final semester. Please note all deadlines.
    - Review your plan of study to see that all degree requirements are met. Revise the plan of study if necessary.

- The Final Semester (Thesis Option):
    - Thesis option students must attend a briefing session on thesis formatting (ECE requires students to use LATEX OVERLEAF ) and preparations for thesis defense. The Department provides student's access to Overleaf, which is a tool that makes the processing of $\LaTeX$ straightforward.
    - Obtain major professor's approval of the thesis prior to scheduling the final examination (defense).
    - Submit Graduate School Form 8 "Request for Appointment of Examining Committee" through *mypurdue.purdue.edu* a minimum of 3 weeks prior to the proposed date of final oral examination/thesis defense. Also, schedule the final examination (thesis defense) with major professor and advisory members at least 3 weeks in advance. You are required to meet the deadlines by which the final thesis examination must be completed. Register for "Candidacy 99100" (0 credit hour) in the final semester of graduation.
    - Distribute electronic copies of thesis to members of the Advisory Committee and the ECE Graduate Co-ordinator (Sherrie Tucker) at least 2 weeks before the oral exam to allow sufficient time for members to review the thesis.
    - Day of defense: Form required Form 9. Electronic available through *mypurdue*.purdue.edu.
    - After the exam and all necessary changes have been made to your thesis. Requirements concerning submission of thesis will be outlined in the briefing session for thesis preparation.
    - See Appendix G for more detailed information on submitting your request for final exam, and Appendix D for ECE graduate faculty identifiers.

- Final Semester (Non-Thesis Option):
    - Register for "Candidacy 99100" (0 credit hour) in your final semester of graduation. Candidacy is required in the final semester of graduation.

# F  Graduate Courses for the Primary Area

The list below was revised on ECE Courses. Note the following abbreviation for primary areas: **Automatic Control, Robotics and System (AC); Communication and Signal Processing (CS); Computer Engineering (CE); and VLSI and Circuit Design (VC).**

| Course Number/Title | AC | CS | CE | VC | Tentative scheduled Semester Offered |
|---|---|---|---|---|---|
| ECE 51000 Introduction to Biometrics | | X | X | | Spring |
| ECE 51501 Smart Grid | X | | | | Summer |
| ECE 52301 Nanosystem Principles | | | | X | Fall |
| ECE 52601 Integrated Nanosystem Processes & Device | | | | X | not offered regularly |
| ECE 52702 Adv. Power Converters | X | | | | Spring |
| ECE 53200 Computational Methods for Power System Analysis | X | | | | Spring |
| ECE 53301 Wireless and Multimedia Computing | | X | X | | Fall |
| ECE 53401 Embedded Autonomous Syst in Automotive Platforms | X | | | | Spring |
| ECE 53700 Multimedia Applications | | X | X | | Not offered regularly |
| ECE 53800 Digital Signal Processing I | | X | X | | Fall |
| ECE 53801 Intro. to Discrete Event Dynamic Sys. | X | | | | Fall |
| ECE 53900 Foundations of Adv. Eng. I | | X | X | | Fall |
| ECE 54400 Introduction to Digital Communications | | X | | | |
| ECE 54700 Introduction to Computer Communication Networks | | X | X | | Fall |
| ECE 54800 Intro. to 2D & 3D Image Proc. | | X | | | Infrequent |
| ECE 55400 Electronic Instrumentation and Control Circuits | | | | X | Spring |
| ECE 55801 System on a chip | | | | X | Spring even year |
| ECE 55900 MOS VLSI Design | | | | X | Fall even year |
| ECE 56401 Computer Security | | | X | | Spring |
| ECE 56500 Computer Architecture | | | X | X | Spring |
| ECE 56601 Real-Time Operating Systems and Applications | | | X | | Fall |
| ECE 56810 Design w/Embedded & Digital Signal Processors | | X | X | | Spring |
| ECE 56900 Introduction to Robotics | X | | | | Fall |
| ECE 57000 Artificial Intelligence | | | X | | Fall |
| ECE 57101 Modeling/Smart Devices | | X | X | | Fall |
| ECE 58000 Optimization Methods for Systems and Control | X | | | | Spring |
| ECE 58500 Automotive Control | X | | | | Spring? |
| ECE 59500 Architecture and Computing Trends in Parallel and Distributed Systems | | | X | | Not offered regularly |
| ECE 59500 Database Management | | | X | | Spring |
| ECE 59500 Intro to Connected & Automated Vehicles | | X | | | Spring?? |
| ECE 59500 Machine Learning & Statistical Signal Proc. | | X | | | Spring odd year |
| ECE 59500 Medical Image Analysis | | X | | | not offered regularly |
| ECE 60000 Random Variables and Signals | | X | | | Fall |
| ECE 60200 Lumped System Theory | X | | | | Spring |
| ECE 60400 Electro Magnetic Field Theory | | | | X | not offered |
| ECE 60600 Solid-State Devices | | | | X | not offered |
| ECE 60800 Computational Models and Methods | | | X | X | Spring |
| ECE 61000 Energy Conversion | X | | | | Fall |
| ECE 62700 Cryptography & Intro. to Secure Comm. | | X | X | | Fall odd yrs. |
| ECE 62900 Neural Networks | | X | X | | Fall |
| ECE 63700 Digital Image Processing I | | X | | | Spring |
| ECE 64800 Wavelet, Time-Frequency, and Multirate Signal Proc. | | X | | | not offered regularly |

| | | | | | |
|---|---|---|---|---|---|
| ECE 66200 Pattern Recognition and Decision-Making Processes | X | X | X | | Spring |
| ECE 68000 Modern Automatic Control | X | | | | Fall |
| ECE 68400 Linear Multivariable Control | X | | | | Not offered regularly |
| ECE 68500 Introduction to Robust Control | X | | | | Infrequent |
| ECE 69500 Mobile Wireless Networks | | X | X | | Not offered regularly |
| ECE 69500 Error Control Coding | | X | X | | Not offered regularly |
| ECE 69311 Internship Credit (pre-approval & permission required) | | | | | |
| ECE 69600 Independent Project course (pre-approval & permission required) | | | | | |
| ECE 69800 MSECE Thesis Credit (permission only) | | | | | |
| ECE 69900 PhD ECE Dissertation Credit (permission only) | | | | | |

Note: The above table represents a tentative frequency of courses offered. Students should rely on the current schedule of classes for courses offered in a given semester and should communicate with their advisers about potential changes in future years.

# G   Final Oral Examination (Thesis Defense)

This appendix describes the procedure for scheduling and completing the final oral examination (defense). *The final exam must be scheduled and announced at least three weeks before the examination date by filing the Graduate School Form 8*. Consult the following procedure for preparing the thesis and final oral examination:

1. ECE Department requires all students to use Latex ( OVERLEAF) to format their thesis.
2. At least two to three weeks prior to the oral examination, provide an electronic draft of your thesis to each member of the examining committee (advisory committee) for review.
3. Necessary forms and final oral exam must be completed by their deadlines. Be sure to have a copy of the "Graduation Deadlines" for the semester you intend to graduate. A copy of the Graduation Deadlines can be obtained from the ECE Graduate Office, you will also receive emails of graduate deadlines.
4. On the day of the final exam, you must have the following form 9 & submit electronically Graduate School Form 9 "Thesis Acceptance."
5. The final copy of your thesis to be deposited needs to comply with the format requirements of the Purdue Graduate School. The thesis must be checked for proper formatting and approved by the Graduate Programs Coordinator before it is deposited. Allow sufficient time to make any changes necessary to ensure that the thesis is in compliance with format requirements. Once all formatting has been finalized and approved, you will receive instructions on how to deposit.