University of Cincinnati

Department of Electrical and Computer Engineering (ECE)

GRADUATE STUDENT HANDBOOK

2025-26

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1.1 Graduate Handbook

The Department of Electrical and Computer Engineering (ECE) Graduate Handbook contains the detailed policies and rules pertaining to the departmental graduate programs and supplements the policies of the College of Engineering and Applied Sciences (CEAS) Graduate Office and the policies of the University of Cincinnati Graduate School. All students admitted to ECE can access a copy of this handbook from the ECE graduate program webpages. Students should familiarize themselves with and to conform to these rules and regulations in this handbook. It is recommended that the students retain a copy of this handbook for their personal use throughout their degree program.

The College of Engineering and Applied Sciences (CEAS) Graduate Office provides assistance with the admissions process and with administrative matters associated with academic programs in CEAS. Information regarding services available and CEAS specific policies is available at the CEAS Graduate Studies website (http://ceas.uc.edu/Graduate_Studies.html).

The University of Cincinnati Graduate School office provides academic leadership, administrative services and, in some cases, financial support to the faculty and students. It coordinates and implements common regulations pertaining to all graduate programs of the University and regulates the awarding of graduate degrees. Information regarding services provided by the University of Cincinnati Graduate School can be found on the UC Graduate School Website (http://grad.uc.edu). The UC Graduate School Student Handbook is also available from the Graduate School website under the Current Students dropdown http://grad.uc.edu/student-life/graduate_studenthandbook.html

Any student who wishes to petition for relief from any of the regulations and requirements contained in this handbook may do so by submitting a written request to the ECE Graduate Program Director who will review the petition with the ECE Graduate Council and render a decision as soon as possible. The Department of Electrical and Computer Engineering reserves the right to make changes or corrections to this handbook and will announce any modifications via email to students.

1.2 The ECE Graduate Program Director

The Graduate Program Director (GPD) is selected by the Department Head to oversee all graduate programs in the ECE department. The GPD administers the graduate program's policies & procedures set by the Graduate Council and approved by the ECE faculty. As Chair of the Graduate Council, the GPD convenes meetings of the council at least once each academic term and liaisons with the CEAS Graduate Office and the UC Graduate School to ensure smooth administrative operations. The GPD assures that accurate records of the graduate programs are kept and are updated in a timely manner. Other duties include checking on the registration of graduate students and monitoring their progress in required courses, assigning graduate teaching assistants and supervising their workload and performance, and advising the Department Head on the needs of the graduate programs. The current ECE Graduate Program Director is:

Prof. Vesna D. Novak
Office: 833 Rhodes Hall
Email: novakdn@ucmail.uc.edu

1.3 The ECE MEng Program Director

The MEng Program Director (MPD) is selected by the Department Head to oversee the Master of Engineering program in the ECE department. The MEng Program Director, in collaboration with the CEAS MEng Coordinator, administers the MEng program's policies & procedures set by CEAS and the ECE Graduate Council. The MPD ensures that accurate records of the MEng programs are kept and are updated in a timely manner. Other duties include checking on the registration of MEng students, monitoring their progress, advising them on the selection of the capstone experience, and advising the Department Head on the needs of the graduate programs. The current ECE MEng Program Director is:

Prof. Xuefu Zhou
Office: 838 Rhodes Hall
Phone: (513) 556-6552
Email: xuefu.zhou@uc.edu

1.4 The ECE Graduate Admissions Director

The ECE Graduate Admissions Director is a faculty member appointed by the ECE Department Head to coordinate the admissions process, including review of applications, tracking offers and acceptances, and reporting data to the faculty. The current ECE Graduate Admissions Director is:

Prof. Ranga Vemuri
Office: 530 Mantei Center
Phone: (513) 556-4784
Email: ranga.vemuri@uc.edu

1.5 The ECE Graduate Council

The Graduate Council consists of Graduate Program Director (GPD) and three faculty, one from each of the ECE graduate programs (CompE, EE-Systems, EE-Devices). The ECE MEng Program Director and the ECE Graduate Admissions Director are ex-officio members of the Graduate Council and also represent their appropriate programs. The ECE Graduate Program Coordinator (if designated) is an ex-officio non-voting member of the Graduate Council. The Graduate Council deliberates on any issues concerning the graduate programs, interprets graduate policy, and proposes new policy from time to time. The Graduate Council also serves as the ECE Grievance Committee for any and all issues pertaining to the graduate programs. Other duties of the Graduate Council include advising and assisting the GPD in their duties and being jointly responsible for admissions, core course curriculum in degree tracks available in ECE, and the generation and balanced allocation of Graduate Incentive Awards (GIA).

A quorum for a Graduate Council meeting consists of at least three voting members. All issues are decided by a simple majority vote of the voting members present. The GPD or a designated representative reports on the activities of the Graduate Council at every regularly scheduled faculty meeting and presents any issues that require a vote of the entire ECE faculty for resolution.

1.6 Degree Programs and Degree Tracks

The graduate program in the ECE is divided into 8 separate degree programs including EE-MEng, EE- MS, EE-PhD, CompE-MEng, CompE-MS, and CSE-PhD (see Section 2.1 for more details). The faculty are organized based on shared research and teaching interests that may span across one or

more degree programs. Each faculty member is granted Graduate Faculty status by the graduate school for the degree programs that are appropriate to their research and teaching interests. A faculty member must have Graduate Faculty status with a degree program in order to serve as thesis/dissertation advisor for students in that degree program. A faculty member may have Graduate Faculty status with multiple degree programs and thus may advise students in one or more of the degree programs, including programs outside ECE.

Degree programs may be divided into multiple degree tracks. Each degree track is a specialization that focuses the coursework and research activities into specific sub-topics related to the broader degree discipline. Faculty members with research and teaching focus related to a degree track determine which courses are required for students in that track. By maintaining current course content and appropriate track course curriculum, the faculty members of a specific degree track ensure that students receiving a graduate degree in ECE have completed a program of sufficient depth and breadth. So long as they obtain/maintain appropriate graduate faculty status, a faculty member may supervise a thesis or dissertation of a student in any degree program in ECE provided that the research topic is appropriate for the degree and the student meets the requirements for their degree program.

1.7 The CEAS Graduate Director for MS/PhD Programs

The CEAS Graduate Director for MS/PhD Programs maintains all graduate records, processes all admission applications for faculty review, updates the student database, and interacts with ECE Graduate Program Director and students to ensure the smooth operation of the ECE graduate programs. The current CEAS Graduate Director for MS/PhD Programs is:

Ms. Julie Muenchen – Director Academics, CEAS Graduate Studies
Office: 801A Mantei Center
Phone Number: (513) 556-0635
Email: julie.muenchen@uc.edu

1.8 The CEAS Manager of Interdisciplinary MEng Programs

While most MEng programs in ECE are managed by the ECE MEng Program Director, some interdisciplinary MEng programs are co-managed at the college level. At this time, the RIAS MEng program and Sustainable Energy MEng program are jointly managed by the ECE MEng Program Director and the CEAS Manager of MEng programs. The current CEAS Manager of MEng Programs is:

Dean Arthur Helmicki
Office: 816 Mantei Center
Phone Number: (513) 556-6069
Email: arthur.helmicki@uc.edu

1.9 The CEAS Assistant Director for MEng and Certificates

The CEAS Assistant Director for MEng and Certificates maintains all MEng records, processes all admission applications for faculty review, updates the student database, and interacts with ECE MEng Program Director, the ECE Graduate Program Director and students to ensure the smooth operation of the ECE MEng program. The current CEAS Assistant Director for MEng and Certificates is:

Ms. Julie Steimle – Assistant Director, CEAS Graduate Studies

Office: 801B Mantei Center
Phone Number: (513) 556-1582
Email: julie.steimle@uc.edu

1.10 Whom to Contact?

The student's primary points-of-contact within ECE are:

For questions related to the MEng Program: ***ECE MEng Program Director***

For all other questions, including those involving coordination between the MEng Program and other programs: ***ECE Graduate Program Director***.

Questions involving CEAS policies, such as program of study, financial aid rules, registration status, graduation, etc., may need to be referred to the CEAS Graduate Director for MS/PhD Programs, the CEAS Manager of MEng Programs, or the CEAS Assistant Director for MEng and Certificates.

2 Application and Admission

2.1 Degree Programs and Certificate Programs

The Department of Electrical and Computer Engineering offers six (6) graduate degrees:

- Master of Engineering in Electrical Engineering (EE-MEng)
- Master of Science in Electrical Engineering (EE-MS)
- Doctor of Philosophy in Electrical Engineering (EE-PhD)
- Master of Engineering in Computer Engineering (CompE-MEng)
- Master of Science in Computer Engineering (CompE-MS)
- Doctor of Philosophy in Computer Science and Engineering (CSE-PhD)

The **Master of Engineering (MEng)** program provides a graduate degree that focuses on the student's ability to contribute to the technical workforce. The MEng program is based on coursework and a capstone project; it does not require a thesis. Students completing an MEng degree will typically not matriculate into a PhD program. However, the difference between the MEng program and the MS program is not in the rigor of the coursework or a qualitative difference in competencies. Rather, the difference lies in the orientation of the MEng program towards participation in the industrial workforce rather than research. More information about the MEng program is available on the CEAS Graduate website at: http://ceas.uc.edu/programs_degrees/MasterOfEngineering.html

The student should refer to the College MEng Handbook for rules applicable to all MEng students.

The **Master of Science (MS**) degree program is a research-based program that provides development of research skills along with expansion of technical expertise associated with completion of advanced engineering coursework. In addition to coursework, students are required to complete a Master's Thesis based on a research project that is closely advised by a member of the ECE faculty. The thesis must be defended orally before a committee comprising the student's advisor and at least two other faculty members. The primary focus of the MS program is to develop technical and research skills necessary for a student to work independently on the development of state-of-the-art technology.

The **Doctor of Philosophy (PhD)** degree program trains graduate students to develop their skills as independent, creative researchers capable of making significant original contributions towards advancing their technical field. In addition to advanced technical coursework, PhD students are expected to work with a dissertation advisor to propose, develop and demonstrate innovative research on a specific topic that extends beyond the current state-of-the-art.

Every student admitted into the PhD program is required to develop a dissertation research proposal based on guidelines similar to those used by many federal funding agencies. To be admitted to candidacy for PhD, the student must successfully defend the proposal before a committee of no less than five members (including the student's dissertation advisor). Upon completion of the dissertation research, PhD students are required to write and orally defend a PhD Dissertation in a public defense before a dissertation committee of no less than five members (including the student's dissertation advisor). This dissertation becomes an archival record of the research completed by the student. Additionally, PhD students are expected to contribute to the body of technical knowledge by disseminating their research results at technical meetings and though publication in technical journals. The members of the student's proposal and dissertation committees must be chosen appropriately with respect to the research topic, and must meet all other guidelines of the ECE Department, the CEAS Office of Graduate Studies, and the UC Graduate School.

The PhD degree can be pursued in a direct route following a Bachelor's degree without first obtaining a Master's degree. Alternatively, the PhD degree can be pursued following the completion of the MS degree.

Each student is admitted into one of the above degree programs. Students may choose between any of the degree tracks that may be offered within a specific degree program. Every attempt will be made to accommodate students into the track of their choice but, given the limited capacity of each track, this cannot be guaranteed. Specific academic requirements including track requirements must be completed before the degree can be awarded. These requirements are summarized in Section 3.

MS and PhD students are required to select a thesis/dissertation advisor as early as possible after joining the graduate program, and certainly within the first academic year. In addition to providing advice related to the execution and documentation of the student's thesis/dissertation research, the thesis/dissertation advisor is responsible for providing academic advising to the student. MEng students receive academic advising from an academic advisor assigned at the beginning of the student's graduate studies. MEng students who choose either the capstone project or capstone paper options will have a project advisor who can be any member of the ECE faculty. MEng students who choose the internship option receive capstone advising from their assigned academic advisor.

In addition to the degree programs described above, students in the ECE department currently have access to three (3) graduate certificates:

- Certificate in Biomedical Informatics
- Certificate in Cyber Operations
- Certificate in Data Sciences

These graduate certificates may be taken in combination with a graduate degree program or may be taken as a stand-alone certificate by non-matriculated graduate student (i.e., working professionals) to enhance employment credentials. The ECE Graduate Program Administrator coordinates with the Graduate Program Director to manage the admission and administrative processes for these certificate programs.

2.2 Application

The ECE graduate program is open to qualified individuals with a GPA of 3.0 or better and a BS (or equivalent degree) in Computer Engineering, Electrical Engineering, or related areas from an accredited college (or equivalent if from an international institution). Prospective applicants with degrees in other fields should see Section 2.6, *Admission with a Degree in Other Disciplines*.

For guidance regarding expectations for standardized testing and typical admissions cutoffs based on standardized test scores, see the *Frequently Asked Questions* section on the CEAS graduate studies website (http://ceas.uc.edu/Graduate_Studies/AdmissionsFAQ.html).

Applicants should indicate their degree goal and research interest areas that best match their area of research and coursework interest. The Graduate Program Director, in consultation with the Graduate Council, will coordinate the evaluation of all the completed ECE applications received and offer admission & financial awards to selected applicants.

2.3 Full-time Admission

A full-time student needs to register for at least 15 graduate credits of coursework for each Fall and Spring semester, attend new student orientation, participate in required seminars, make satisfactory

progress toward the degree while maintaining a satisfactory GPA (3.0 or higher), and adhere to the time limits for degree completion.

MS and PhD students who have completed their coursework and all of their required thesis/dissertation hours may go on reduced course load while they complete and defend their thesis/dissertation research. On reduced course load, students must register for at least 1 credit hour of thesis/dissertation research every academic year term (Fall and Spring semesters) that they are on campus and working towards completion of their thesis/dissertation. Registration during the Summer term is not required. Domestic (U.S.-based) students who have completed their thesis/dissertation research and are working off campus while writing of their thesis/dissertation documents may register for a minimum of one credit hour per academic year. International students are not allowed to work off campus during the writing of their thesis/dissertation and therefore must continue to register for 1 credit hour in both the Fall and Spring semesters.

MENG students who have completed their coursework and all of their required MENG capstone project hours may go on reduced course load while they complete their capstone project. On reduced course load, students must register for at least 1 credit hour of MENG capstone project every academic year term (Fall and Spring semesters) that they are on campus and working towards completion of their capstone project. Registration during the Summer term is not required. Domestic (U.S.-based) students who continue to work on the capstone project may register for a minimum of one credit hour per academic year. International students who are performing internship option for their capstone project must continue to register for 1 credit hour MENG capstone project in both the Fall and Spring semesters.

Only full-time students are eligible for financial aid such as Graduate Incentive Awards or graduate assistantships.

2.4 Part-time Admission

Part-time admission is provided mainly for the convenience of students who are employed full-time in the Cincinnati area or for students whose family responsibilities preclude full-time study. **International students are not eligible for part-time status.** Successful completion of a degree on a part-time basis requires extraordinary commitment on the part of the student. Obtaining a PhD degree requires that a student be full-time for at least two semesters, and the PhD degree cannot be awarded for less than the equivalent of 3 years of full-time graduate study. The ECE Department discourages the pursuit of the PhD on a part-time basis.

The requirements for part-time students are the same as those for full-time students (see above). The only difference is that the student is not required to register for 15 or more credits each academic term, and is not eligible for financial aid. However, to remain active in the ECE graduate program, the student must register for at least one credit hour *each* term (except in the Summer semester) until all required course work and thesis/dissertation research credits has been completed. After all required course work and thesis/dissertation research credits have been completed, part-time students are only required to register for one credit hour for each academic term that they are on campus working towards completion of the thesis/dissertation research. As with full-time domestic students who are only working to complete the thesis/dissertation research, students must register for a minimum of one credit hour per academic year.

2.5 Provisional Admission

Occasionally, provisional admission may be granted to applicants who lack undergraduate course work considered essential for study in ECE. Specific courses will be required to make up such deficiencies before admission to full graduate standing can be granted. This additional course work, the conditions, and the timeline in which it has to be completed will be detailed in the student's admission letter. If the student does not meet these conditions in the allotted time, they will be dismissed.

2.6 Admission with a Degree from Other Disciplines

Applicants with a Bachelor's or Master's degree in another branch of engineering, physics, or mathematics are often able to pursue graduate study in ECE. They may be asked to take additional undergraduate, dual or graduate-level courses beyond the standard requirements in order to be on par with students with a degree in the proper field. Some of this additional coursework may be required prior to admission confirmation. Applicants are encouraged to contact the Graduate Program Director prior to submission of a graduate school application to determine if their background is likely to constitute a competitive application. Some of the additional coursework taken to qualify for admission may not be counted towards the student's degree requirements.

2.7 Special Degree Programs

In collaboration with the General Electric (GE) Corporation, ECE has established a special MS program entitled the Advanced Course in Engineering (GE-ACE) program. This program is only available to GE employees and details are described in Section 4.8. A similar program has been established for students from Xetron (Northrop-Grumman).

ECE offers a special non-thesis MS program only to students who pay full tuition. Students in this program are not eligible for GIA or any other financial aid. Details are described in Section 4.9.

2.8 Application Procedure

Applications to the ECE graduate program are submitted through an online application process. Completion of the application process requires the following items.

- **Transcripts** – Applicants must upload unofficial transcripts to the application.
- **Test Scores** - Applicants must enter any required standardized test scores.
- **Recommendations** – Letters of recommendation are requested on line and the application must list the names of recommenders.
- **Statements** - A statement of purpose and a statement of research are required from each applicant. The statement of research should describe any research that the applicant has been involved in, including senior projects and Master's thesis. If an applicant has not participated in anything related to research or projects, they should simply state this in their statement of research.
- **Research Areas of Interest** - Applicants must also choose areas of research interest from a drop down menu on the application.

For more information about the application process including information regarding application deadlines and application fees, please see the detailed admission FAQ on the CEAS Graduate Admissions website (http://ceas.uc.edu/Graduate_Studies/ApplyOnline.html).

2.9 Students Not Matriculated in ECE

Full-time or part-time students at the University of Cincinnati who are not undergraduate/graduate students in the Department of Electrical and Computer Engineering (i.e. non-matriculated students) may take ECE graduate courses with permission from the course instructor. Non-matriculated students enrolled without instructor consent are subject to administrative withdrawal from the course. Non-matriculated students are also subject to administrative withdrawal if space is needed in the course for students who are matriculated in an ECE undergraduate/graduate degree.

Permission to enroll in graduate courses does not imply admission to the ECE graduate degree program, nor does it imply that such courses will be accepted toward the ECE graduate degree if the student is admitted in the future.

2.10 Transfer of Credits

Transfer of graduate credits towards graduate degree programs in ECE is not allowed for course work taken as part of a program that has already resulted in the award of a Bachelor's or Master's degree (i.e., no double-counting of the same course for multiple degrees). The number of transfer credits from another university accepted for the graduate degree program is at the discretion of the Graduate Program Director and Graduate Council, but ordinarily will not exceed 9 semester hours of graduate credit. Approval of transfer of credits for courses taken at other institutions must be obtained within the first semester of the student's degree program. Thesis/dissertation course work cannot be transferred. For students entering with an MS degree, no further non-UC credits may be accepted for transfer.

2.11 International Student Admission

No international student will be granted admission on any basis other than full graduate standing and they ***must*** register for 15 program approved graduate credits each academic term, except during the Summer semester. Only in the final semesters, when the only task left is writing a thesis or completing a capstone project, can an international student register for just one credit each term.

All international students are required to carry the University Health Insurance. A physical examination is required of each international applicant. A tuberculin tine test or chest X-ray is required within 1 week of arrival.

For matters concerning visa and immigration rules, international students must contact: Office of International Student Services, PO Box 210640, University of Cincinnati, Cincinnati, OH 45221-0640. For more information see the UC International Services website (https://www.uc.edu/about/international.html), call the office at 513-556-4278 or email the office at international.students@uc.edu .

2.12 Change of Degree Program

A student wishing to change their degree program must petition the ECE Graduate Program Director and, in some cases, the ECE Graduate Council. The petition must include the reason for the change and evidence for the student's preparation for the new degree program. If the change is approved, the student will be required to completely meet the degree requirements of their new degree program.

The following rules apply to specific degree change situations:

Conversions from MS or PhD to MEng

Students admitted to the MS or PhD programs are expected to remain in those programs and pursue their coursework and thesis/dissertation research as required by their program. However, students may apply for transfer to MEng if they have not yet selected a thesis/dissertation advisor. If the student already has a research advisor, submitting a petition for the change will also require approval from that advisor. CEAS will also require the student to take additional classes to meet MEng requirements, and to pay tuition based at current rate with no GIA scholarship funds. ***If the student has an advisor, that advisor may require the student to complete specific remaining work, including any work for which the student has received a Research Assistantship***.

Conversions from MEng to MS

Conversion from MEng to MS can only be requested after the completion of at least one full semester in the MEng program. Approval requires the following: 1) A GPA of 3.5 or higher in the engineering courses taken up to that point (excluding the core MEng non-engineering courses, seminars, research credits, and self-study research); 2) A written commitment from an ECE faculty member to serve as the student's MS thesis advisor. The GPA requirement is strictly enforced, and can only be waived by permission of the Graduate Program Director and Department Head under extraordinary circumstances (e.g., if a faculty member commits to supporting the student on a funded research project for the duration of their degree). Approval can be obtained after one semester but the degree change will take place after two full-time semesters under MEng tuition and GIA rules, converting to the MS GIA amount in the third academic semester.

Conversions from MEng to PhD

Conversions from MEng directly to PhD will ***not*** be approved, except by permission of the Graduate Program Director and Department Head under extraordinary circumstances (e.g., if a faculty member commits to supporting the student on a funded research project for the duration of their degree).

Conversions from PhD to MS

Conversions from PhD to MS must be requested by the third semester of study at UC can be approved by the Graduate Program Director. After that, it will require the additional approval of the student's dissertation research advisor, and the advisor may require the student to complete specific remaining work, including any work for which the student has received a Research Assistantship.

Conversions for MS/PhD students between areas (EE, CompE, and various tracks)

Internal program and track can be requested with the written approval of the student's research advisor (if already assigned) and the ECE Graduate Program Director. The student must also provide written commitment by a faculty member in the new area to serve as the student's research advisor. If the transfer is approved, the student will be responsible for satisfying all the course requirements of their new program.

Conversions for MEng students between areas (EE, CompE, and various tracks)

Internal program and track conversions can be requested with the written approval of the ECE

MEng Program Director. There is no guarantee that the transfer will be approved – especially for transfers into tracks which already have many students. If the transfer is approved, the student will be responsible for satisfying all the course requirements of their new track. Given the tight schedule of the MEng program, transfer requests should be made as early as possible.

All degree conversions are final.

Any further change after the first one will require approval of the ECE Department Head and the CEAS Office of Graduate Studies.

3 ECE Degree Requirements

3.1 Master of Science:

Minimum of 30 semester credits consisting of:

- A minimum or 21 credits of graduate coursework that satisfy the following requirements:
  - A minimum of 9 course credits must be completed from the list of **required** and **core** courses for student's degree track.
  - A minimum of 6 course credits must be completed at the 7000+ level.
  - The remaining course credits should be determined in consultation with the student's thesis advisor.
- 9 credit hours of Thesis Research (EECE 9089)
- 2 credits of seminar (EECE 7001 & 7002) and 1 credit of EECE 7004 Practical Experience. Seminar and Practical Experience do not count as coursework or towards the 30 minimum credit hours.

To be awarded the MS degree, the student must complete all degree requirements and graduate within 5 years. The student must have at least a B average (GPA of 3.0+) for all graduate credits. In addition, at least 2/3 of the graduate credits of the coursework necessary for the degree must be at a level of B or higher. (B- counts as below B). More detailed requirements for the MS degree are given in Section 4.

3.2 Master of Engineering:

A minimum of 30 credit hours with *no grades below a C* in:

- 6-9 credit hours in MEng program core
- 10-15 credit hours in required track core courses
- 3-9 credit hours in elective courses
- 3 credit hours in MEng Seminar (ENGR 7001)
- 3 credit hours in MEng Capstone Project (EECE9060 for EE, EECE 9061 for CompE)

To be awarded the degree of MEng, the student must have at least a B average (GPA of 3.0+) for all graduate credits. In addition, at least 2/3 of the graduate credits of the coursework necessary for the degree must be at a level of B or higher. (B- counts as below B).

Each student admitted into the MEng Program is assigned to a program track. Each track has a faculty advisor (track advisor) and specific course requirements. The list of tracks and track advisors is given later in this section. More detailed requirements for the MEng degree are given in Section 5.

3.3 Doctor of Philosophy:

3.3.1 Credit hours for the Direct PhD Route Beyond a Bachelor's Degree:

90 credit hours consisting of:

- A minimum of 30 credits of graduate coursework that cover the following requirements:
  - A minimum of 9 course credits must be completed from the list of **track** courses for student's degree area.

- A minimum of 15 course credits must be completed at the 7000+ level.
- The remaining course credits should be determined in consultation with the student's research advisor.

- A minimum of 40 credits of Dissertation Research.
- 2 credits of seminar (EECE 7001 & 7002) and 1 credit of EECE 7004 Practical Experience. Seminar and Practical Experience do not count as course work or towards the 90 minimum credit hours.
- No more than 6 credits of EECE 9080, Doctoral Dissertation Proposal, may be counted towards fulfilling the 90 credits of PhD degree requirement. The 6 credits of EECE 9080 may only be applied to research related to the preparation of the dissertation proposal and not towards the requirements of the classroom coursework credits.

3.3.2 Credit hours for PhD beyond the Master's Degree:

60 credit hours consisting of:

- A minimum of 18 credits of classroom coursework that cover the following requirements:
  - A minimum of 9 course credits must be completed from the list of **required** and **core** courses for student's degree track.
  - A minimum of 9 course credits must be completed at the 7000+ level.
  - The student should consult their research advisor for the remaining courses.
- At minimum of 30 credits of Dissertation Research
- 2 credits of seminar (EECE 7001 & 7002) and 1 credit of EECE 7004 Practical Experience. Seminar and Practical Experience do not count as course work or towards the 60 minimum credit hours.
- No more than 6 credits of EECE/CS 9080, Doctoral Dissertation Proposal, may be counted towards fulfilling the 60 credits of PhD degree requirement. The 6 credits of EECE 9080 may only be applied to research related to the preparation of the dissertation proposal and not towards the requirements of the classroom coursework credits.

3.4 Rules applicable to all PhD students

1. The doctoral degree requires, at a minimum, the equivalent of three years of full-time graduate study. All requirements for PhD must be completed within nine (9) years of initial enrollment. A student's candidacy will terminate automatically if they fail to register appropriately during an academic year.
2. The last 30 credits must be completed under the direction of UC faculty at the University of Cincinnati.
3. At least 9 credit hours of classroom coursework at 7000 or higher level must be completed from the course categories marked as Primary to the student's degree program.
4. No more than 6 credits of Doctoral Dissertation Proposal, may be counted towards fulfilling the 90 credits of PhD degree requirement. These 6 credits may only be applied to research related to the preparation of the dissertation proposal and not towards the requirements for classroom coursework credits.
5. In order to be awarded the degree of Doctor of Philosophy, the student must have at

least a B average (GPA of 3.0) for all graduate credits. In addition, at least 2/3 of the graduate credits of the course work necessary for the degree must be at a level of B or higher (B- counts as below B).

6. By October 15 each year beginning with the student's second year in the PhD program, they must prepare a 2-page *annual performance report* (APR) in collaboration with their advisor and submit it to the ECE Graduate Director. The report must include the following sections: a) Summary of academic/research progress and accomplishments over the previous year (for the first report, also a summary of initial discussions with the advisor and the choice of research topic); b) Specific plans and goals for the next year; c) A brief statement by the student's advisor regarding their progress, along with a specific evaluation on a 4-level Likert scale (0 = poor, 3 = excellent). The report must be signed by both the student and their research advisor. The report will be reviewed by the ECE Graduate Council and given a *satisfactory* or *unsatisfactory* evaluation, with feedback on remedial measures in the latter case. For an unsatisfactory APR, a revised report incorporating the short-term remedial measures (e.g., more details about goals) should be submitted by the first week of the subsequent Spring semester. Any longer-term remedial measures must be addressed in time for the next APR and will be part of its evaluation. A student's current APR status must be *satisfactory* in order to be admitted to PhD candidacy.
7. To be admitted to PhD candidacy, a student must have a peer-reviewed publication by the end of their fifth full (non-Summer) semester (typically Fall of Year 3). The requirement can be met by: a) A peer-reviewed *full-length* research paper accepted for the proceedings of a recognized professional conference (indexed by SCOPUS or dblp), OR b) A research paper in a SCOPUS-indexed journal that has been accepted or is under revision after at least one review cycle with a recommendation of "revise and resubmit" or better. To be counted towards this requirement, the paper must be based on research done at UC under the guidance of the student's advisor, and the student must be the lead author on the paper. A student who does not meet this requirement may request a grace period of at most two semesters in writing with the signature of their advisor. A student who still fails to meet this requirement will not be permitted to continue in the PhD program and must leave with a terminal MS (thesis or non-thesis) degree.
8. A PhD student must successfully write and defend a dissertation proposal in order to be admitted into PhD candidacy. The written proposal must include the goals and specific aims of the proposed research, a brief survey of the relevant literature, a description of methods for the proposed work, results from preliminary work, a clear statement of remaining work, and a timeline for completion. Typically, the length of the written proposal would be between 20 and 35 pages, single-spaced, 12-point type, including figures, tables, and bibliography. The oral defense of the dissertation proposal may not be attempted any sooner than concurrently with the last semester of required coursework and must be successfully completed no later than the end of the student's sixth full semester in the doctoral program (excluding Summer semesters). The student may submit a timely petition signed by the student and their advisor to the Graduate Program Director for a ***one-time*** extension of the proposal defense deadline. The petition must provide concrete reasons for the extension and must state a reasonable target date which will be enforced.

9. The final public oral defense of the dissertation must be completed within four years of admission into PhD candidacy. A two week public notice must be submitted to the CEAS Graduate Program Director, 801A Mantei Center to announce the final defense and the student must post a notice of the defense on the Graduate School's website at www.grad.uc.edu. Both notices are mandatory and failure to submit them will result in the defense being invalid. A notice submitted less than two weeks prior to the defense will not be accepted. If there are any changes in the date or time of the defense, a new two-week notice must be submitted. Committee members must receive a copy of the dissertation a minimum of two weeks prior to the defense. The Department requires that a minimum of 7 months must elapse between admission to doctoral candidacy and the receipt of the PhD degree. This requirement can be waived in exceptional circumstances by written permission from the Graduate Program Director, with appropriate justification.

More detailed requirements for the PhD degree are given in Section 7.

3.5 Course Requirements for MS/PhD Degree Tracks

The set of track courses is given below for the currently recognized ECE degree tracks.

A. ***EE MS/PhD Sensors and Microsystems*** (take at least 3 out of 7)

EECE 6007	Introduction to Biomedical Microsystems (Fall)
EECE 6008	Fundamentals of MEMS (Fall)
EECE 6018	Microfabrication of Semiconductor Devices (Fall)
EECE 6041C	Microfabrication Lab for Semicond Dev & MEMS (Spring)
EECE 6050	Compound and Organic Semiconductor Physics (Spring)
EECE 6088	Nanoelectronic Devices for VLSI Technologies (Fall)
EECE 6051	Introduction to Sensors (Spring)

B. ***EE MS/PhD Systems*** (take at least 3 out of 7)

EECE 6016C	Electric Machines & Drives (Fall)
EECE 6019	Introduction to Random Processes (Fall)
EECE 6024	Introduction to Digital Signal Processing (Fall)
EECE 6027	Digital Communication Systems (Spring)
EECE 6036	Intelligent Systems (Fall)
EECE 6042	Digital Image Processing (Fall)
EECE 7033	Linear Systems Theory (Spring)

C. ***CompE MS*** or ***CSE PhD (CompE Track)*** (take at least 4 out of 6)

EECE 6029	Introduction to Operating systems (Fall & Spring)
EECE 6030	Trust in Digital Hardware (Fall)
EECE 6051	Database Theory (Fall & Spring)
EECE 6080C	Introduction to VLSI Design (Fall)
EECE 6083	Compiler Theory and Practice (Spring)
EECE 7095	Introduction to Computer Architecture (Fall)

D. ***VLSI Design Track*** (Coordinator: Prof. Wen-Ben Jone)

The VLSI Design Track can be taken by students enrolled in EE, CompE or CSE-PhD degree programs. It has a required sequence of VLSI focused courses. Students must also complete a

minimum of two courses from the list of core courses associated with their degree designation

Required Course Sequence

EECE 6080C	Introduction to VLSI Design (Fall)
EECE 6082C	VLSI Design for Test and Power (Spring)
EECE 6086C	VLSI Design Automation (Spring)

Students registered as EE students (i.e. not CompE MS or CSE-PhD) must complete 2 courses from the following list:

EECE 6007	Introduction to Biomedical Microsystems (Fall)
EECE 6008	Fundamentals of MEMS (Fall)
EECE 6016C	Electric Machines & Drives (Fall)
EECE 6018	Microfabrication of Semiconductor Devices (Fall)
EECE 6019	Introduction to Random Processes (Fall)
EECE 6024	Introduction to Digital Signal Processing (Fall)
EECE 6027	Digital Communication Systems (Spring)
EECE 6030	Trust in Digital Hardware (Fall)
EECE 6036	Intelligent Systems (Fall)
EECE 6041C	Microfabrication Lab for Semicond Dev & MEMS (Spring)
EECE 6042	Digital Image Processing (Fall)
EECE 6050	Compound and Organic Semiconductor Physics (Spring)
EECE 6088	Nanoelectronic Devices for VLSI Technologies (Fall)
EECE 6051	Introduction to Sensors (Spring)
EECE 7033	Linear Systems Theory (Spring)

Students registered as CompE MS or CSE-PhD students must complete 2 courses from the following list:

EECE 6029	Introduction to Operating Systems (Fall & Spring)
EECE 6030	Trust in Digital Hardware (Fall)
EECE 6051	Database Management (Fall & Spring)
EECE 6088	Nanoelectronic Devices for VLSI Technologies (Fall)
EECE 6083	Compiler Theory and Practice (Spring)
EECE 7095	Introduction to Computer Architecture (Fall)

E. ***Cybersecurity Track*** (Coordinator: Prof. Boyang Wang)

The Cybersecurity Track can be taken by students enrolled in the CSE-PhD degree program. Students in the EE-PhD degree program may also choose this track with permission from the graduate director and Cybersecurity track coordinator. This track offers a set of courses covering fundamental knowledge to address cybersecurity problems related to hardware, software, systems, networks, and Artificial Intelligence. Students must take at least 3 out of nine 6000-level courses and take at least 1 out of three 7000-level courses.

Course Options: (take at least 3 of 9 6000-level and at least 1 of 3 7000-level)

EECE 6023	Security and Trust for Cyber-Physical Systems (Fall)
EECE 6030	Trust in Digital Hardware (Fall)
EECE 6034	Hardware Design with FPGAs: Security & Trustworthy Systems (Spring)
EECE 6054	Cryptography Theory and Engineering (Fall)

CS 6038	Malware Analysis (Spring)
CS 6053	Network Security (Spring)
CS 6055	Cyber Defense Overview (Fall)
CS 6056	Security Vulnerability (Spring)
CS 6058	Data Security and Privacy (Fall)
EECE 7034	Intelligent Agents (Spring)
EECE 7075	Principles of Modern Networking (Spring)
EECE 7095	Introduction to Computer Architecture (Fall)

F. ***Data Science Track*** (Coordinator: Prof. Boyang Wang)

The Data Science Track can be taken by students enrolled in the CompE-MS or CSE-PhD degree programs. Students in the EE graduate programs do a certificate in this track with permission from the track coordinator. This track has a required sequence of courses focused on data sscience topics. Students must take all these courses.

Required Course Sequence:

CS 6052	Intelligent Data Analysis (Fall & Spring)
CS 6054	Information Retrieval (Fall)
CS 6065	Cloud Computing (Spring)
CS 7070	Big Data Analytics (Spring)

Not all track courses are offered each year. If a student is not able to take a specific required course, they can ask for a substitution with a course of similar relevance with permission from their research advisor and the ECE Graduate Program Director.

Students in the ECE Department must register for the ECE Seminars (EECE 7001 and 7002), ECE Practical Experience (EECE 7004) and for ECE Thesis/Dissertation credits (EECE 9089). Students in the ECE Department should not register for the equivalent CS courses, nor should students in the CS department register for the ECE courses.

For all tracks, the remaining courses necessary to satisfy the general MS or PhD degree requirements will be selected with direction from the student's thesis advisor. Students are encouraged to check course availability through One Stop http://onestop.uc.edu

3.6 MEng Program Tracks

The following table lists all MEng Tracks and track advisors. The course requirements for each track are available in the MEng Graduate Handbook.

Track Name	**Program**	**Advisor**
Cyber Security	CompE, EE (with permission)	Prof. Marc Cahay
Data Science	CompE	Prof. Boyang Wang
Embedded Systems	Any	Prof. April Dai
Computer Engineering - General	CompE	Prof. April Dai
Advanced Electronic Materials, Devices, and Circuits	EE	Prof. Tao Li
Systems Engineering	EE	Prof. Mehdi Norouzi
VLSI	EE, CompE	Prof. Wen-Ben Jone

4 Requirements for Master of Science (MS) Degree

4.1 Basic Requirements

A master of science (with thesis) degree provides students with the opportunity to acquire in-depth knowledge in specific areas of their field, and to conduct substantial original research. The degree is suitable for those who wish to pursue a Ph.D. degree, or to do advanced work in industry. A minimum total of 30 semester credit hours are required for the MS degree: 21 credit hours of graduate course work, of which 6 credit hours must be 7000+ level or higher and 10 credits of thesis research, 2 credits of seminar, and 1 credit of Practical Experience. (Seminar credits and Practical Experience credit cannot be counted towards the 20 course credit requirements or the 30 total credit hour requirements.)

A non-thesis version of the MS degree requiring, in lieu of thesis research credits, 6 additional credit hours of coursework and a 3 credit hour capstone project is also offered by the ECE Department, but is only available to students if: a) The student has been in the program for 9 semesters or more; or b) The student has become ineligible to continue in the regular MS program.

In order to be awarded the degree of Master of Science, the student must have at least a B average (GPA of 3.0) for all graduate credits. In addition, at least 2/3 of the graduate credits of the above required course work necessary for the degree must be at a level of B or higher (B- counts as below B).

4.2 Research Advisor

Thesis research must be performed under the supervision of a *research advisor*. who must be a faculty member with a full, joint, or secondary appointment or Graduate Faculty status in the ECE Department. If the research advisor has a primary or joint appointment in the ECE Department, they are also the student's *academic advisor*. Otherwise, the student must choose an additional full or joint appointment ECE faculty member as their academic advisor, who will work jointly with the research advisor to guide the student, and will be a member of the student's thesis committee. The student's research advisor will be the Chair of their thesis committee.

The list of faculty members with Graduate Faculty status in the ECE and CS departments in included in Section 17 of this Handbook.

All MS thesis students must officially identify an advisor by the end of the student's first Spring Semester. The process is to meet and discuss with faculty in the student's research interest and identify an advisor that will accept them into their program. Once an advisor is identified, an Advisor Change Form available on the CEAS Student Portal must be completed. This form must be signed by the new advisor and the department's Graduate Program Director and submitted to the Graduate Studies Office at engrgrad@uc.edu or in person at 801 Mantei Center. If a student cannot identify an advisor within one calendar year (from the first day of classes in the semester in which they were admitted) they will not be permitted to continue in the thesis-based MS program and must switch to the MEng program or leave the graduate program.

The rules for change of advisors and termination of advising are detailed in Section 11.2

4.3 Program of Study and Courses

Each student admitted into an MS degree program must satisfy the requirements of their degree program to graduate. The following are rules that apply to **ALL** MS degrees in ECE:

- Courses taken on an audit basis do not count towards the degree.
- No credits of Doctoral Dissertation Proposal are counted towards the degree.
- Every student must register in Seminar for both Fall and Spring semester during the first year of study. These seminar credits are not counted toward the degree requirements.
- The student must prepare a Program of Study in conjunction with their academic advisor satisfying the degree requirements and also completing the courses required or recommended by their degree track. Required and recommended courses in each degree track are determined by the faculty comprising that track and approved by the Graduate Council. A student must get ***prior*** approval from their advisor and the ECE Graduate Program Director for any deviation from the track requirements. ***Post-facto approval of deviations will not be granted***.
- The Program of Study must be updated and approved by the student's academic advisor in May of each year for the student to be eligible for a Graduate Incentive Award (GIA) in the following year.
- A student who changes degree program or degree track will be expected to complete the courses required by the new degree program and track as of the date the change is made. Any deviations from this procedure must be approved in writing by the ECE Graduate Program Director.
- In individual cases, a student may be asked to take additional graduate level courses in order to make up any deficiencies. A graduate course outside the ECE or CS departments taken for remedial reasons cannot be counted towards the required coursework for the degree, unless approved by the student's thesis advisor and the ECE Graduate Program Director.
- A minimum of 2/3 of the course credit hours completed to satisfy the degree coursework requirement must be taken from courses offered by the ECE department. Waiver of this requirement is allowed in rare circumstances with permission of the student's thesis advisor and the ECE Graduate Program Director.
- A maximum of 1/3 of the course credit hours completed to satisfy the degree coursework requirement may be earned outside of the ECE department. These outside courses must be approved in writing by the faculty advisor and the ECE Graduate Program Director prior to course registration. These courses may not include independent study, research, and seminar courses. Students who do not possess the equivalent of a B.S. degree in Computer Engineering, Electrical Engineering, or a closely related area are generally urged to take the maximum amount of their graduate course work in ECE.
- A minimum of 6 credits must be completed at 7000+ level. 7000+ level coursework taken outside of ECE may be used to satisfy this requirement with the approval of the student's thesis advisor and the ECE Graduate Program Director.
- No more than 9 credits towards the MS may be earned at another university, and in no case may the final experience requirement (thesis) be satisfied by work done mostly elsewhere.

4.4 MS Degree Completion Time

After completing three academic years (9 total semesters, including summer) as an MS student, a student's advisor must either: a) Provide one year of funding and complete the thesis; or b) The student must switch to a non-thesis (MS non-thesis, not MEng) degree.

If the non-thesis option is chosen, the student will complete the non-thesis requirements in the 10th semester. The student will be provided one more GIA scholarship semester to satisfy the non-thesis degree requirements within that semester. Credits taken in the MS program for Thesis/Dissertation research and seminar will not count towards a non-thesis degree

If the advisor and the student both choose to continue with a thesis route (with funding), a completion plan must be submitted to the Graduate Program Director and the CEAS Graduate Studies Office for approval. Any approved plan will be strictly enforced.

All full-time and part-time students must complete all requirements for the MS degree no later than five years from the date of first registration. A student who exceeds this limit must request an extension. Extension forms are available at:
http://www.grad.uc.edu/file_pdf/RevisedRandEGraduatePetition.pdf

4.5 Formation of Thesis Committee

After a student has chosen their permanent research advisor, the faculty advisor will guide the student in selection of a thesis committee. The MS thesis committee is composed of a minimum of 3 full-time faculty members. The student's permanent research advisor will be the chairperson of the committee. A majority of the faculty that comprise the MS thesis committee must be tenure track, full-time, UC faculty with Graduate Faculty status at UC and a full or joint (not secondary) appointment in the ECE Department. An appropriate committee member from outside the University of Cincinnati can be included with permission from the CEAS Graduate Office provided that the majority rule stated above is satisfied.

The major responsibility of the thesis committee is to evaluate the MS thesis written by the student and to approve or disapprove the final defense of the MS thesis. Other responsibilities include assisting in the advising of thesis research, and helping to develop the student's program of study, if requested by the thesis advisor and the student.

4.6 Thesis Submission, Defense and Acceptance

When the research is essentially completed to the satisfaction of the permanent research advisor, the student should prepare a final draft of their thesis. Guidance for preparation of the thesis document can be found on the University of Cincinnati Graduate School website (https://grad.uc.edu/student-life/etd.html) including links that address required order of pages within the thesis document and thesis formatting guidelines. It is the student's responsibility to ensure that their thesis document conforms to the guidelines imposed by the Graduate School to ensure uniformity in thesis submitted to the Electronic Thesis/Dissertation (ETD) system.

The student should give the advisor sufficient time to review the final draft of the thesis before scheduling the final defense. After the advisor has reviewed the thesis, recommended changes have been made, and the final text and form of the document have been approved by the advisor, the student should prepare the thesis in the final form and submit copies to their thesis committee for evaluation and oral defense before the committee.

A final defense of the thesis is required of every student after they have fulfilled all other requirements of the MS program. The student, in consultation with their advisor, should schedule the thesis defense, which is presented in an open and announced meeting. The thesis advisor will instruct the student regarding specific materials that must be presented at the defense and will preside over the meeting.

A copy of the thesis should be in the hands of each member of the thesis committee **at least one week before the final defense** so that the committee members have ample time for careful review. Failure to meet this deadline may result in rescheduling of the thesis defense date. All the members of the thesis committee should be present at the final defense.

Students must submit a one-week public notice to the CEAS Graduate Studies Office, 801 Mantei Center, and also must post their public notice on the UC Graduate School's web site at www.grad.uc.edu. Both notices are required no less than one week prior to the thesis defense. If notice is not given, the defense is not valid.

The thesis presentation is important and should be well prepared. The student is allowed approximately 40-45 minutes for the oral presentation. Following the oral presentation, the thesis committee, other faculty, students, and any others are allowed to ask questions. At the conclusion of this period, all those present other than the members of the thesis committee will be excused. The committee may then continue to question the student until they are satisfied that they have sufficient information to vote on whether or not the student should pass the thesis defense. The student's MS thesis committee will then make a decision on this forthwith by vote. A majority of the committee must concur in the final decision. If the student does not pass the thesis defense, then the thesis committee in consultation with the Graduate Program Director will decide upon a future course of action.

There may be changes and additions or deletions required in the thesis as a result of the defense. These must be made by the student and approved by the advisor. The final corrected version must be submitted in electronic form to the University's Electronic Thesis/Dissertation (ETD) site by the date established by the CEAS Graduate School. The thesis will undergo an automated plagiarism check and approval of the results by the student's advisor before the submission.

There is no longer an expectation to produce bound copies of the final thesis document. If students and/or faculty choose to have a final copy of the thesis bound, resources for thesis binding can be found online.

4.7 Milestones for Completion of the MS Degree

The MS program of study can typically be completed in 2 academic years. Highly motivated students may be able to complete all required MS degree milestones early in their second year. Students who face significant research challenges may take longer than 2 academic years while following the rules in Section 4.4. The timeline below shows the significant MS degree milestones for the typical student.

MS Degree Milestones:

- Prepare Program of Study with support of Temporary Advisor during Department Orientation (attendance is mandatory)
- Attend Program Seminar I (Fall of Year 1)
- Choose research faculty advisor by the middle of the Spring semester of Year 1. Revise Program of

Study if needed.

- Attend Program Seminar II (Spring of Year 1).
- Complete one semester of Practical Experience after all course requirements are completed.
- Obtain final approval of Program of Study by the ECE Graduate Program Director by the end of Year 1.
- Explore feasibility of MS Thesis Research project (Summer of Year 1 or Fall of Year 2).
- Fulfill research requirements as defined by the thesis advisor (Spring/Summer of Year 2).
- Write the thesis document (Spring/Summer of Year 2).
- Establish MS Thesis Committee (Spring/Summer of Year 2).
- Schedule final thesis defense, submit public notice one week prior and post on graduate school website (Spring/Summer of Year 2).
- Successfully defend MS Thesis Research project and submit the final approved version to the University system.
- Publish 1 manuscript in peer-reviewed scientific journal or competitive archival conference proceedings.

4.8 Master of Science GE-ACE Program

In concert with the General Electric (GE) Corporation, ECE has established a special MS program entitled the GE Advanced Course in Engineering (GE-ACE) Program. This program awards advanced standing to GE employees admitted to this program that have successfully completed well-defined, in-house programs of study at GE whose content has been approved by the Department's faculty. The student is awarded advanced standing with the number of credits as defined below.

A student completes the remainder of their program of study for the MS degree by taking graduate courses from ECE and other CEAS departments. A student who is subsequently dropped from this program after completing the in-house (GE) courses may no longer receive advanced standing credit in the department for these GE in-house courses, but may remain enrolled in the MS degree program provided they maintain an adequate GPA and make adequate progress towards the degree.

Admission of a student by General Electric to this program does not imply admission to ECE. Each student must apply individually and directly, following normal application procedures. Admission is considered on a case-by-case basis; the Department retains the right to refuse admission to any student whom it considers unacceptable, even though the student may have successfully passed the in-house GE courses and be in good standing with GE in the ACE program. A student will be informed in writing of their admission status.

At the outset of their program of course work, each student must submit and file a Program of Study approved both by GE and the ECE Graduate Program Director. No specific courses are required, but the student's program of study must contain a concentration of at least 18 credits of course work in a focused research area.

Subsequent changes in selected courses must be approved in advance by both parties (GE and ECE); unapproved substitutions will result in unapproved courses not being applied towards the degree requirements. Additionally, the student must specify in writing their selection of the thesis or project option. When the project option is selected, the specific project to be undertaken must be agreed to in writing by the student, GE and the faculty member serving as the project advisor. It is the student's responsibility to secure these approvals.

The program requirements for the Advance Course in Engineering ACE program are specified

below:

Project Option

6 credits A courses at GE
4 credits B courses at GE
+ 18 credits course work at UC; (minimum of 6 credit hours must be 7000+)
28 credits total course work
+ 2 credits project (MS Project)
30 credits in total

Thesis Option

6 credits A courses at GE
4 credits B courses at GE
+ 14 credits course work at UC; 12 credits minimum in ECE
24 credits total course work
+ 6 credits thesis (Thesis/Dissertation Research)
30 credits in total

5 Requirements for a Master of Engineering (MEng) Degree

5.1 General Program Information

A Master of Engineering degree focuses on the practice of engineering in order to better serve working professionals. Rather than culminate in a research experience and a thesis, the MEng curriculum provides skills and expertise that enhance the individual's ability to contribute to the technical workforce in today's competitive environment.

Depending on a student's interest, the degree could add significant depth to an individual's understanding of the practice of engineering or the program could be constructed to focus on greater inter-disciplinary breadth if that is the educational objective of the student. The MEng degree also provides registered professional engineers with an academically-based program to obtain the continuing education requirements to maintain licensure.

Students can obtain the Master of Engineering degree in two areas: Electrical Engineering and Computer Engineering.

5.2 Application and Admission

Admission requirements for the MEng Program are the same as those for the MS Program. MEng applicants may request a waiver of some of the admissions requirements if they provide strong evidence to the ECE MEng Program Director that they have had sufficient experience to warrant a waiver. Potential applicants seeking a waiver of admissions requirements should discuss their admissions situation prior to submitting an application for admission.

5.3 MEng Tracks

Each student admitted into the MEng Program is assigned to a program track. Each track has a faculty advisor (track advisor) and specific course requirements, which can be found in the MEng Program Handbook, or from the ECE MEng Program Director. Students who wish to apply for a track change must apply to the ECE MEng Program Director at or shortly after Orientation, or as early as possible if the choice is made later. ***There is no guarantee that track change requests will be approved***.

5.4 Advising

In addition to the ECE MEng Program Director, students can meet with the CEAS Manager of the Master of Engineering programs for initial academic planning and course recommendations. Each MEng track also has at least one dedicated Track Advisor who will provide guidance on track-specific courses. Each student will be assigned to a specific Track Advisor. Since the structure of the MEng program is more flexible than most graduate programs, it is very important that students meet with the specific Track Advisor or ECE MEng Program Director to establish the program of study early in the first semester of study.

Students seeking an MEng degree do not complete a thesis. Rather, there is a capstone project to be completed (see below for details). The student should meet with the ECE MEng Program Director and/or capstone course instructor in the first week of second semester (Spring Semester) regarding the project to seek guidance commensurate with the academic requirements. *It is not the responsibility of the advisor to identify a project for each student.*

Changes or exceptions to MEng requirements including course substitution, special topics, and credit hour distribution between core and track areas must be approved by the MEng Graduate Program Director and/or the CEAS Manager of MEng Programs.

The ECE MEng Program Director or the CEAS Manager of MEng Programs is required to sign off on graduation certifications for MEng students approving that they have met the MEng requirements for graduation.

5.5 Basic Requirements

The degree is based on the successful completion of a minimum of 30 credits of graduate-level course work. The curriculum is structured to provide a foundation of advanced engineering topics while allowing students flexibility to meet their specific educational objectives. The curriculum includes:

- Program core courses taken by all MEng students regardless of the track they pursue (2 courses providing 6 credit hours). The core provides skills in the effective practice of engineering recognizing that for experienced practitioners, effectiveness includes technical skills, project and task management skills, and interpersonal skills.
- Required track courses from the discipline of interest (3-5 courses providing 9-15 credit hours depending upon the track).
- Elective courses which permit breadth, depth, or interdisciplinary focus depending on student educational objectives (number of course credit hours required depends upon the track).
- ENGR 7001 MEng Seminar (3 credits) taken in the first semester.
- Capstone project demonstrating applications of skills and synthesis of knowledge (3 credit hours depending on the options described below). If additional credit hours are taken, they do not count towards a course requirement. With the approval of the ECE MEng Program Director, students can choose to complete the capstone project in one of three ways: 1) to complete a project under the supervision of a faculty advisor; 2) to do an internship at a company or research lab; or 3) to prepare a written paper under the supervision of a faculty advisor.

5.6 Capstone Project

The capstone project is focused on the application of principles and the practice of engineering and is not meant to be a mini-thesis. The capstone projects provide a mechanism to demonstrate a synthesis of knowledge and the application of advanced concepts learned in class to a specific problem. It is expected to take one semester to complete, and can take one of the following three forms:

- ***Project*:** A project is done under the guidance of a specific project advisor, and typically involves work on solving a specific problem, e.g., writing application software, analyzing data, etc. The student must identify the project and advisor by exploring available opportunities in a timely manner. includes a written report and a presentation. The report will be read and graded by the specific project advisor. If the project is performed in conjunction with work duties, the report and presentation should also be given to the student's employer.
- ***Internship*:** Students can choose to perform an internship if this furthers their learning and career goals. The internship must be related to the student's degree area. Students selecting this option will also prepare a report and submit it to the Track Advisor (assigned).

Internships will be approved for 3 months and can be extended for an additional 3 months with the approval of the advisor. International students can be approved for curricular practical training (CPT) to participate in an internship. Additional documentation is needed for the extension if requested. CPT cannot be done until two semesters of study are completed. CPT can only be done prior to or up until a graduation date. CPT will be terminated upon graduation.

- ***Paper*:** A written paper can be completed under the supervision of the MEng advisor. The paper will address a topic related to the discipline (track) and require the integration of multiple topics within that discipline.

Students should register for their Capstone Project in the Spring term. Detailed expectations for the spring's Capstone Project course together with a series of assignments to help students complete the capstone projects will be given at the beginning of Spring Semester.

Students who seek to finish a project or paper during their second semester must work closely with the capstone advisor and / or other faculty member throughout the semester in order to complete the capstone by the end of the spring semester or the following summer semester. Please note that students can complete the project in the Summer or Fall term if needed.

5.7 Full-Time MEng Schedule

The table below provides a sample schedule for MEng Students. It should be noted that the number of required courses for each track varies.

	Fall Semester	Spring Semester
Core Courses	Core Course #1	Core Course #2
Track Required Courses[1]	Track Course #1	Track Course #3
	Track Course #2	Track Course #4
Elective Courses[2]	Elective Course #1	Elective Course #2
MEng Seminar	MEng Seminar	
Capstone Project		Capstone Project
Credit Hours	15	15

[1] *Discipline specific course*

[2] *At the discretion of the program, student and the advisor*

The MEng program of study can typically be completed in 1 academic year, though an internship will typically be done in the Summer semester of that year. Full-time and part-time students must complete all requirements for the MEng degree no later than five years from the date of first registration.

5.8 Transfer from MEng to MS or PhD

Students will be allowed to transfer from MEng status to MS or PhD status only after one full semester of residency as an MEng. Only students meeting *all* the following requirements will be considered:

- A GPA of 3.5 or higher in the *engineering* graduate courses taken up to that point (excluding the core MEng non-engineering courses, seminars, research credits, and self-study research).
- A written application indicating the proposed objectives of the transfer.

- A written and signed commitment from an ECE faculty member to serve as the student's MS thesis advisor.
- Signature of the ECE Graduate Program Director.
- Satisfaction of any financial and other requirements imposed by the College of Engineering and Applied Science.

The GPA requirement is strictly enforced and can only be waived by permission of the Graduate Program Director and Department Head under extraordinary circumstances (e.g., if a faculty member commits to supporting the student on a funded research project for the duration of their degree). Approval of a transfer is not automatic even if all requirements are met, and may be denied by the ECE Graduate Program Director or Department Head. If approved, the transfer is final and the student will not be allowed to transfer back to MEng except under extremely rare extenuating circumstances. Direct transfers into the PhD program will not be allowed unless the student's proposed advisor commits to funding them for the duration of their degree.

5.9 Graduation Requirements

Students must complete all the academic requirements of the program to graduate including:

- Minimum of 30 credit hours with no grades below a C
- Capstone project
- Minimum of 3.0 GPA
- 2/3 of courses needed for graduation with grade of B or higher (B- does not count)

In addition, students must complete the following forms, have them signed, and returned to the CEAS Graduate Office (801A Mantei):

- Final program of study form
- Capstone Completion form

Students must apply online for graduation http://grad.uc.edu/student-life/graduation.html and pay the graduation fee even if a student does not intend to attend graduation ceremonies.

5.10 MEng Miscellaneous

International students must be registered every academic year until they graduate or go on approved OPT.

6 ACCEND Program for ECE Undergraduates

6.1 Basic Requirements

The Accelerated Engineering Degree, ACCEND, is a program offered by the College of Engineering and Applied Sciences for undergraduates with GPA greater the 3.2. The ACCEND program allows students to earn their undergraduate and master's degrees in a shortened time frame while still enjoying the benefits of UC's top five nationally ranked cooperative education program. After their first year in an engineering or technology degree program, qualified students are able to apply for admission to the ACCEND program. Students enrolled in ACCEND are able to earn their undergraduate and master's degrees in part from classes taken during their co-op placement and using any AP credits they may have.

Students in the program fulfill part of the requirement for additional classes by taking courses during their co-operative work assignments. These are generally done through distance learning or in the evenings and usually amount to about a third of the added courses. The remaining graduate courses are taken in lieu of advance placement credits (generally earned during high school) and by sacrificing one co-op assignment in favor of a full class load.

Degree combinations available within the ECE ACCEND program include:

- EE undergraduate and EE/CompE/CS MS/MEng or AI/RIAS MEng
- CompE undergraduate and EE/CompE/CS MS/MEng or AI/RIAS/SE MEng
- CS undergraduate and CompE MS or MEng
- EE/CompE/CS undergraduate and MBA

MS ACCEND programs offer an undergraduate degree in engineering along with the Master of Science in an engineering discipline will appeal to students who are interested in research and greater depth in a particular engineering field. These students often go on to PhD programs or work in fields that require more specialized knowledge. The MS ACCEND track culminates in a research experience and thesis.

MEng ACCEND programs offer an undergraduate degree in engineering along with the Master of Engineering will appeal to students who are interested in greater breadth in engineering and want to focus on the practice of engineering. These students often seek pragmatic skills and knowledge that will allow them to improve the contribution they make to a technical organization. The MEng provides a traditional coursework-based master's and does not include a thesis component.

MBA ACCEND offers an undergraduate degree in engineering along with the Master of Business Administration will appeal to students who want to understand both the technical side of an organization and the business aspects of the organization. Students seek this program because it increases their value to an organization and prepares them to take on a management role earlier in their careers. For more information on the ACCEND Program, including links to the program application and the ACCEND Graduate Handbook, see the ACCEND program webpage on the CEAS graduate studies website (http://ceas.uc.edu/programs_degrees/accelerated_engineeringdegreeaccend.html).

6.2 Rules for ACCEND Students

Students can apply to ACCEND after completing at least two full-time semesters in CEAS if their GPA is 3.2 or higher. Students apply using the ACCEND Request Form.

ACCEND students must apply on the College graduate website for graduate student status in the year that they will take their first graduate level course that will count towards their graduate degree, e.g., if a 4th year student wants to take one graduate level course in the Fall of the coming academic year, they must apply for graduate status in the preceding Summer semester. Applications for Fall admission are open each year until August 1st. The link to apply is https://grad.catalyst.uc.edu/apply/ . In the application, the student can upload a copy of their unofficial transcripts from Catalyst; an original transcript is not needed. The application will have a question, "Are you continuing to the AIM program?" The answer is YES. AIM/ACCEND are the same program types. The student should complete the online application and confirm their admission. From this point forward all graduate level courses will count towards their MS/MEng degree.

ACCEND student qualify for a maximum of 2 semesters of Graduate Incentive Award Funds (GIA). Students must take a minimum of 7 graduate credit hours in a full-time semester and a maximum of 18 graduate credit hours to qualify for GIA funds.

ACCEND students do not qualify for GA/RA/TA support unless they have graduated with their BS degree. They do qualify to work as a student worker. The rate of pay for student workers is 12.00/hour for undergraduate students who have not applied for graduate status and are not receiving a GIA scholarship, and $14.00/hour for graduate-level ACCEND students that are taking a minimum of 7 graduate credit hours in a full-time semester and receiving GIA funding.

If an ACCEND student is offered a position, they must let the business manager know that they are an ACCEND student and their registration status: an undergraduate ACCEND student not receiving GIA funds, or a graduate ACCEND student receiving their GIA funds. Students should be in their 5th year to be a graduate ACCEND student receiving GIA funds.

7 Requirements for Doctor of Philosophy (PhD) Degree

7.1 Basic Requirements

The Doctor of Philosophy degree is conferred on the basis of extended study and high scholarly attainment in a specific field of study. For the PhD degree, a minimum of 60 graduate semester credits are required beyond the MS degree (90 semester credits beyond the B.S. degree) including 30 credits for doctoral dissertation research, 2 credits of seminar, and 1 credit of Practical Experience. The student must write and defend a dissertation proposal to be admitted to doctoral candidacy. They must write and defend a doctoral dissertation in a public setting to complete their degree. The doctoral program is normally a full-time program throughout all the course work and the dissertation. A minimum of three years of full-time study is required by the University and the Department does not encourage part-time studies in the PhD program.

The basic requirements and rules applicable to all PhD students are listed in Sections 3.3 and 3.4. All these must be followed strictly as required.

7.2 Direct Route to the PhD

Students entering the graduate program with a bachelor's degree (in accordance with the admission requirements of Section 2) and wishing to proceed directly into the doctoral program without obtaining the MS degree may do so by satisfying the requirements listed in Sections 3.3.1 and 3.4. No MS thesis is required.

Students committed to the direct route program, who subsequently decide to terminate their program before completing the PhD, may only receive the MS by satisfying the normal MS degree requirements.

7.3 Research Advisor

Dissertation research must be performed under the supervision of a *research advisor*. For EE PhD students, the advisor must be a faculty member with a full, joint, or secondary appointment or Graduate Faculty status in the ECE Department. For CSE PhD students, the advisor must be a faculty member with a full, joint, or secondary appointment or Graduate Faculty status in either the ECE Department or the CS Department, or both. If the research advisor has a primary or joint appointment in the ECE Department, they are also the student's *academic advisor*. Otherwise, the student must choose an additional full or joint appointment ECE (or CS for CSE students) faculty member as their academic advisor, who will work jointly with the research advisor to guide the student, and will be a member of the student's dissertation committee. The student's research advisor will be the Chair of their dissertation committee.

The list of faculty members in the ECE and CS departments is given at the end of the Handbook. The Graduate Faculty status of each faculty member can be obtained from the CEAS Graduate Office.

All PhD students must officially identify an advisor by the Spring of their first year. The process is to meet and discuss with faculty in the student's research interest and identify an advisor that will accept them into their program. Once an advisor is identified, an Advisor Change Form available on the CEAS Student Portal must be completed. This form must be signed by the new advisor and the department's Graduate Program Director and submitted to the Graduate Studies Office at engrgrad@uc.edu or in

person at 801A Mantei Center. If a student cannot identify an advisor within one calendar year (from the first day of classes in the semester in which they were admitted) they will not be permitted to continue in the PhD or thesis-based MS program.

The rules for change of advisors and termination of advising are detailed in Section 11.2

7.4 Program of Study

In order to obtain a PhD from the Department of Electrical and Computer Engineering, a student must complete courses for the degree program (Electrical Engineering or Computer Science & Engineering) and meet the course requirements for the degree track in which the student is working. Additional courses to make up the total required for the PhD should be chosen in consultation with the student's advisor. Because of the need to complete the degree program and degree track required courses, each student needs to plan their program of study carefully. Required and recommended courses in each degree track are determined by the faculty comprising that track and approved by the Graduate Council. A student must get ***prior*** approval from their advisor and the ECE Graduate Program Director for any deviation from the track requirements. ***Post-facto approval of deviations is not possible***.

A student who changes degree program or degree track will be expected to complete the courses required by the new degree program and track as of the date the change is made. Any deviations from this procedure must be approved in writing by the ECE Graduate Program Director in consultation with the Graduate Council.

It is the responsibility of both the student and their advisor to formulate a program of study to meet the objectives and needs of the student. An initial Program of Study Form for the first year should be completed by the student and approved by the ECE Graduate Program Director during the student's initial orientation, and a more comprehensive plan of study should be formulated with the approval of the student's faculty research advisor and the ECE Graduate Program Director once the student has an advisor. This program of study should contain both breadth of knowledge and depth of specialization. The final authority for a student's program of study is vested in the student's advisor and the ECE Graduate Program Director, but the program of study must meet the appropriate requirements for the degree program and degree track in which the student is working. Revisions of a student's program of study are to be expected but must be approved by their advisor and the ECE Graduate Program Director.

The Program of Study must be updated and approved by the student's research advisor in May of each year for the student to be eligible for a Graduate Incentive Award (GIA) in the following year.

A direct-route PhD student is expected to complete their coursework within 5 semesters after enrolling in the PhD program. For students entering the PhD program with a Master's degree, coursework is expected to be completed within three semesters. The Program of Study submitted for approval should follow these guidelines, and serious deviations from this schedule must be approved by the ECE Graduate Program Director.

If a student does not have a BS or MS in the area they wish to pursue for their graduate degree (Computer Engineering or Electrical Engineering), they may be required to complete additional graduate or undergraduate course work in addition to the minimum graduate credits required for the PhD degree. The Department recognizes that, in such cases, the timeline for completion of coursework may be longer. A program of study can also be interdisciplinary, requiring course work from multiple schools. However, in such cases the student's faculty advisor should consult the

student's dissertation committee during the development of their program of study, and the changes must be approved by the ECE Graduate Program Director.

Full-time students must be registered for a minimum of 15 graduate credits each semester excluding the summer. Courses taken on an audit basis are excluded from these numbers and do not count towards the degree. The student must include in their registration the appropriate department seminar in the Fall and Spring semesters of their first year; however, these credits are not counted towards the degree.

7.5 Formation of the Dissertation Committee

After a student has selected their dissertation research advisor, the advisor will guide the student in selection of a PhD Dissertation committee. The PhD committee is composed of at least 5 full-time members of whom a minimum of one must be from outside the ECE Department (external member). ***The committee must include at least 3 tenured or tenure-track faculty members with full or joint (not secondary) appointment in the ECE Department***. The dissertation advisor will be the chairperson of the committee. If the chairperson is not a member of the Graduate Faculty, at least three other members of the committee must be members of the Graduate Faculty. The external committee member may be a University of Cincinnati faculty member who does not have either a primary or joint appointment in ECE. It can also be someone who is either on the faculty at another institution or who has distinguished credentials that justify their inclusion as a member of the dissertation committee. The inclusion of any committee member from outside the University of Cincinnati must be pre-approved by the Graduate School through the CEAS Graduate Office in 665 Baldwin Hall.

The responsibilities of the committee include the following:

- Assisting the student in developing their program of study, if requested by the student's dissertation advisor.
- Evaluating the student's dissertation research proposal, its presentation and the student's defense, and the overall performance in the oral examination for admission to doctoral candidacy.
- Advising and assisting the student in dissertation research if requested by the student or by the faculty advisor.
- Evaluating the PhD dissertation written by the student and approving or disapproving the final defense of the dissertation.

7.6 Annual Performance Review

By October 15 each year beginning with the student's second year in the PhD program, they must prepare a 2-page ***annual performance report*** (APR) in collaboration with their advisor and submit it to the ECE Graduate Director. The report must include the following sections: a) Summary of academic/research progress and accomplishments over the previous year (for the first report, also a summary of initial discussions with the advisor and the choice of research topic); b) Specific plans and goals for the next year; c) A brief statement by the student's advisor regarding their progress, along with a specific evaluation on a 4-level Likert scale (0 = poor, 3 = excellent). The report must be signed by both the student and their research advisor. The report will be reviewed by the ECE Graduate Council and given a satisfactory or

unsatisfactory evaluation, with feedback on remedial measures in the latter case. For an unsatisfactory APR, a revised report incorporating the short-term remedial measures (e.g., more detail about goals) should be submitted by the first week of the subsequent Spring semester. Any longer-term remedial measures must be addressed in time for the next APR and will be part of its evaluation. A student's current APR status must be satisfactory in order to be admitted to PhD candidacy.

7.7 Doctoral Qualifying Publication

To be admitted to PhD candidacy, a student must have a peer-reviewed publication by the end of their fifth full (non-Summer) semester (typically Fall of Year 3). The requirement can be met by: a) A peer-reviewed full-length research paper ***accepted for publication*** in the proceedings of a recognized professional conference (indexed by SCOPUS or dblp), OR b) A research paper in a SCOPUS-indexed journal that has been ***accepted or is under revision after at least one review cycle with a recommendation of "revise and resubmit" or better***. To be counted towards this requirement, the paper must be based on research done at UC under the guidance of the student's advisor, and the student must be the lead author on the paper. A student who does not meet this requirement may request a grace period of at most two semesters in writing with the signature of their advisor. A student who still fails to meet this requirement will not be permitted to continue in the PhD program and must leave with a terminal MS (thesis or non-thesis) degree.

7.8 Dissertation Proposal and Oral Examination

A PhD student must successfully write and defend a dissertation proposal in order to be admitted into PhD candidacy. The written proposal must include the goals and specific aims of the proposed research, a brief survey of the relevant literature, a description of methods for the proposed work, results from preliminary work, a clear statement of remaining work, and a timeline for completion. Typically, the length of the written proposal would be between 20 and 35 pages, single-spaced, 12-point type, including figures, tables, and bibliography. The oral defense of the dissertation proposal may not be attempted any sooner than concurrently with the last semester of required coursework and must be successfully completed no later than the end of the student's sixth full semester in the doctoral program (excluding Summer semesters). The student may submit a timely petition signed by the student and their advisor to the Graduate Program Director for a one-time extension of the proposal defense deadline. The petition must provide concrete reasons for the extension and must state a reasonable target date which will be enforced. The student may register for a maximum of 6 credits of Doctoral Dissertation Proposal, which may be counted towards the total doctoral credit requirements but not for classroom coursework credit.

The dissertation proposal presentation and the oral examination are to be in an announced meeting open to the dissertation committee, as well as ECE faculty and other invited faculty, with arrangements made by the faculty advisor. Following the oral presentation, the dissertation committee and any other faculty present will be allowed to ask questions. After the question and discussion period is concluded, all those present other than the committee members will be excused and the committee may continue questioning the student in a closed-door session until they feel they have sufficient information to determine the outcome. The student will then be asked the leave the room, and a vote will be taken to determine whether the student has passed the presentation and oral exam. The majority decision of the dissertation committee will determine the outcome. At this point, provided the student has completed all the course work, and completed any special requirements imposed by the dissertation committee, the student will be formally accepted into doctoral

candidacy. The dissertation committee may, at this time, direct the student to modify their research plans in specific ways, and these requirements will be a factor in the committee's evaluation of the student's final dissertation.

In general, direct-route PhD students are expected to defend their proposal no later than their sixth semester in the program, and preferably in the fifth. PhD students with a Master's degree are expected to defend their proposal no later than their fourth semester in the PhD program. Thus, it is extremely important for all PhD students to obtain a research advisor by the end of their first Spring semester, so they have adequate time to plan their research and write a proposal on schedule. Significant deviations from this schedule may elicit a query from the ECE Graduate Program Director and require justification.

7.9 Admission to Doctoral Candidacy

All doctoral students must meet the following requirements for admission to doctoral candidacy:

- Successful completion of all doctoral course work with a grade point average of at least 3.00.
- Selection of a dissertation advisor and successful formation of a dissertation committee.
- Satisfactory most recent annual performance review.
- Satisfaction of the requirement for qualifying publication.
- Successful completion of the dissertation proposal and passing of the oral examination.
- Completion of any special requirements imposed by the PhD dissertation committee.

Acceptance into candidacy will be formally indicated and the student will be so notified by letter from the University Dean of Graduate Studies.

7.10 Time Limits and Residency

The doctoral degree requires, at a minimum, the equivalent of three years of full-time graduate study. The residency requirement is stated in the University Graduate Handbook. All full-time students meet the residency requirement. Because of this requirement, the Department does not encourage part-time studies in the PhD program.

All requirements for the PhD must be completed within nine (9) years of initial enrollment. A student's candidacy will automatically terminate if they fail to register appropriately during an academic year. The Department requires that a minimum of 7 months must elapse between admission to doctoral candidacy and the receipt of the PhD degree. This requirement can be waived with the written approval of the student's research advisor and the CEAS Program Director.

7.11 Dissertation Submission, Final Defense, and Acceptance

The research must be completed, the dissertation written, and successfully defended before the PhD degree is conferred. The primary requirement of a dissertation is that it shows evidence of high scholarly attainment through original and independent research work. The acceptability of a dissertation depends upon its quality rather than the time and credit hours spent on the research work.

When the dissertation research is completed to the satisfaction of the dissertation advisor, the student should prepare a final draft of the PhD dissertation. This draft should be submitted to the dissertation advisor for critical review and evaluation before scheduling the final defense of the dissertation. The student must give the advisor sufficient time to review the draft of the dissertation.

After the advisor has gone over the draft and has approved the document, the student should prepare the dissertation in the final form and submit a copy of the completed dissertation to each dissertation committee member for critical evaluation *at least one week* before the final defense. Information concerning the required dissertation format, reproduction, and other regulations for preparing a dissertation is available from the University of Cincinnati Graduate School at https://grad.uc.edu/student-life/etd.html

A final defense of the dissertation (final oral examination) is required of every doctoral candidate after they have fulfilled all other requirements of the doctoral program. This examination is administered by each student's dissertation committee and is restricted to the content of the dissertation and closely related subject matter. The dissertation advisor (who is also the chairperson of the committee) will help schedule the final dissertation defense in consultation with the other committee members. All the members of the dissertation committee should be present at the final defense of the dissertation. The defense is a public event, and is open to other faculty and students. The student or the committee members may also invite personal guests to the defense.

Students must submit a 2-week public notice to the CEAS Graduate Studies Office, 665 Baldwin Hall and also must post their public notice on the UC Graduate Schools web site at www.grad.uc.edu. Both notices are required no less than two weeks prior to the dissertation defense. If notice is not given, the defense is not valid.

The dissertation defense includes approximately 45-50 minutes of oral presentation of the dissertation research by the student, followed by questions and comments from members of the dissertation committee. The dissertation presentation is important and should be well prepared in consultation with the faculty advisor.

After the committee has completed its questioning, attending faculty, students and others will be allowed to pose questions. At the conclusion of the question and discussion period, all those present other than the dissertation committee members will be excused. The committee may then choose to continue questioning the student until they are satisfied that they have sufficient information to make a decision regarding the defense outcome. The candidate will then leave the room, and the dissertation committee will make a decision forthwith by vote regarding the acceptability of the dissertation and its defense, and report to the candidate. At least a majority of the committee must concur in the final decision.

If the student does not pass the final defense of the dissertation, the committee, in consultation with the ECE Graduate Program Director, will decide upon a future course of action. If the student passes, the committee will complete and sign the dissertation approval page and other ECE forms and forward them to the Graduate Program Director.

There may be major or minor changes and additions or deletions required in the dissertation by the committee. These must be made by the student and approved by the dissertation advisor before the student can be certified. The final corrected version must be submitted in electronic form to the University's Electronic Thesis/Dissertation (ETD) site by the date dissertations are due for the appropriate semester. Prior to final submission, the dissertation must undergo a mandatory automatic plagiarism check and the results approved by the student's advisor.

While there is no longer an expectation to produce bound copies of the final dissertation document, if students and/or faculty choose to have a final copy of the dissertation bound, resources for dissertation binding can be found online. It is also generally expected that the doctoral candidate will write up the dissertation research as papers for publication in refereed journals or for presentation at a

conference where papers receive a comparable review. PhD candidates are expected to have one or more papers published before their final defense.

7.12 Timeline for Completion of the PhD Degree

The Direct Route PhD program can be completed in 4-5 academic years. The PhD program beyond the MS degree can typically be completed in 3-4 academic years. Highly motivated students may be able to complete all required PhD degree milestones in less time than the typical completion timeline. Students who face significant research challenges may take longer than the typical completion time. The timeline below shows the significant PhD degree milestones for the typical student.

PhD Degree Milestones (3-5 years):

- Prepare Program of Study with support of Temporary Advisor during Department Orientation
- Attend Program Seminar I in Fall of Year 1.
- Choose research faculty advisor by the middle of Spring semester in Year 1.
- Revise Program of Study if needed.
- Attend Program Seminar II in Spring of Year 1.
- Complete one semester of Practical Experience after all course requirements are completed.
- Explore feasibility of dissertation Research project during Summer of Year 1 and Fall of Year 2.
- Submit first APR by October 15 of Year 2.
- Establish PhD Dissertation Committee (at least 5 faculty -- majority from ECE faculty plus 1-2 outside experts)
- Substantially complete required coursework by Spring of Year 2.
- Submit at least one journal or conference paper in the Summer of Year 2 or Fall of Year 3 (to allow sufficient time for review by the end of the publication deadline of Summer of Year 3).
- Write dissertation proposal based on ECE Proposal Guidelines and defend it successfully by Fall or Spring of Year 3
- Advance to PhD candidacy by Spring of Year 3.
- Write the dissertation document.
- Submit public notice of final defense 2 weeks prior and post on graduate school website
- Successfully defend PhD dissertation.

8 Registration and Grades

8.1 Program of Study Form

Newly admitted graduate students are required to attend the CEAS Graduate Student Orientation and the ECE Department Orientation before classes start in the Fall semester. At these orientation meetings, general CEAS and department policies will be discussed. A temporary advisor will be assigned to all students at this time. By default, the temporary advisor will be the ECE Graduate Program Director unless otherwise specified. The temporary advisor and faculty members from each degree program will be available during the department orientation to answer questions and assist students in course selection. Each student will keep their temporary advisor until a permanent research advisor is chosen. With the temporary advisor, the student will determine a preliminary program of study and fill out the Program of Study Form for the first year. A final and complete Program of Study will be filled out by each student after they have a research advisor and have advanced further into their coursework. This Plan of Study must satisfy the requirements of the student's degree program unless a deviation is authorized explicitly by the advisor and the ECE Graduate Program Director using an orange change form.

8.2 Registration

A student should only register for courses after they have obtained the signature of the advisor on the Program of Study Form and submitted a copy to the CEAS Graduate Program Coordinator. The preliminary Program of Study filled out during the orientation is a planning document, and the student may take courses other than those listed in it, *provided that the courses fall within the requirements of the student's degree program as listed in this Handbook*. Any deviations beyond that must be approved by the student's advisor and by the Graduate Program Director using an orange change form. It is the student's responsibility to ensure that required courses in the program are taken and that any remedial course work is done as early as possible.

8.3 Changes in Registration

The deadlines for any changes (Add/Drop) in registration are listed each semester on http://www.onestop.uc.edu/calendars.html. An instructor may withdraw a student from a course when excessive absences have occurred. The College of Engineering and Applied Science (CEAS) enforces deadlines, and only the most extreme and unusual circumstance would justify a deviation.

Any changes that conflict with the student's formal Plan of Study after it has been submitted must be authorized by the student's advisor and the ECE Graduate Program Director on an orange change form. Failure to do so may affect completion of the degree or the renewal of any financial aid.

8.4 Full-Time Course Load

Full-time graduate students must register and maintain a minimum of 15 program approved graduate credits in each semester of the academic year. These credits include seminars, self and independent study, research, and thesis/dissertation research, but courses taken on an audit basis are excluded. Withdrawing and falling below 15 credits hours will cancel any Graduate Incentive Award (GIA) or other financial aid that the student has, and the student will be responsible for payment of any fees and tuition resulting from this. Once a student has completed all course work and has sufficient thesis/dissertation research credits for their degree, they are eligible to go on reduced course load. For

international students this means registering for one credit hour each Fall and Spring semester until graduation. For US students, this means registering for one credit hour each Fall and Spring semester that they are on campus working towards completion of their thesis/dissertation research. US students may drop to one credit hour per academic year if they are working off-campus to complete the writing of their thesis/dissertation document.

8.5 Part-time Course Load

Part-time graduate students must register for at least one credit during the Fall semester of each academic year to remain active in the ECE graduate degree programs. However, it is generally expected that every part-time student will take at least one course per semester or register for thesis/dissertation research to complete the degree program within the time frame prescribed by the University. Registration is required for at least one credit hour during a semester of the academic year in which the student graduates.

8.6 Changes to Part-time/Full-time Status

A student wishing to change between part-time and full-time status must submit a request for this change using the appropriate change form. The reason for the request must be included and the change must be approved with signatures from the faculty advisor and Graduate Program Director. International students must maintain full-time status and cannot switch to part-time status.

8.7 Students Receiving Financial Aid

Students receiving a Graduate Incentive Award (GIA), a Graduate Assistantship (GA), or other financial assistance must maintain full-time status. If a student withdraws from a course during the semester so as to fall below the minimum 15 program approved graduate credits, they may be liable for tuition for that semester. Students with a GIA must also pay for any credits over 18 credits, including audit credit hours.

For more information and guidelines applicable to students receiving financial aid, see Section 10.

8.8 Grading Policies

- All required or elective coursework that counts toward a Certificate, MEng, MS, or PhD degree must have a letter grading option (A, A-, B+, B, B-, C+, C, or F.)
- At least 2/3 of the graduate credits of required course work necessary for a degree must be at a level of B or higher (B- is 2.67 credits and is below a B).
- A student must maintain a cumulative GPA of 3.0 or better in required course work.

A student who fails to maintain the required GPA will usually receive a warning and will be placed on academic probation with specific instructions on how to avoid dismissal by a specific date. Failure to meet these requirements by the designated time will result in dismissal from the graduate program.

8.9 I, IP, SP, UP, NG, X and F grades

If a grade of incomplete (I) is assigned at the end of a course, the student must clear the incomplete from the record as soon as possible and at most within one calendar year. It is the student's responsibility to ensure that the work is completed and that they discuss the grade change with the instructor. After one calendar year, the grade lapses to a failure grade called I/F. No student can

graduate with an I, IP (in progress), SP (satisfactory progress), UP (unsatisfactory progress), X (unofficial withdrawal), or NG (no grade reported) on their record unless this is approved explicitly by the Associate Dean of the Graduate School, which will only be done in exceptional circumstances. A student who has a grade of F in any required course will not be considered to have completed the requirement of that course for the degree. The student must repeat that course and receive a grade of C or better to graduate without approval from the Associate Dean of the Graduate School. However, in this case, the original F still remains on the transcript alongside the new grade and is still counted in the calculation of the student's GPA.

A student who completes a course and either did not receive a grade, or received an F or I grade may not subsequently withdraw from the course to avoid grade point average difficulties without prior advisor permission. Such permission will ordinarily not be given except in rare circumstances where the student can provide adequate justification, such as a physician's written, dated, and signed statement if a medical reason is claimed.

It is the student's responsibility to know these rules and make sure that any grades that need modification are updated in time.

8.10 Audit Regulations

Admissions and conditions for participation in audit courses are at the discretion of the instructor of the course, who is not obligated to accept a student for audit. Students must follow any Audit requirements set by the instructor. Grades that an instructor can give for an Audit class are "T" (for satisfactory completion of Audit requirements) or "F" (Unsatisfactory completion of Audit requirements). It is the student's responsibility to clearly understand the Audit requirements of the course.

Audit credits do not count toward degree requirements or full-time status. However, they do count for tuition purposes. Hence a student on a GIA/GA will be assessed for any credits over 18, including audit hours. A student cannot take a course for credit after having audited it in a prior semester.

8.11 Seminars

Seminars are offered to familiarize the students with research done inside/outside of the ECE Department and to help students develop professional skills necessary for successful completion of their degree program. Attendance at the seminar is required of all first year MS and PhD students for Fall and Spring semesters. Specific requirements that each student needs to complete for a passing grade varies among the degree programs and will be announced during the first meeting of the seminar. Attendance will be taken and missing more than one seminar class may result in an irreversible "F" grade.

8.12 Independent Study, Research Courses

ECE offers several graduate courses that can be taken on an individual basis with a separate section number allocated for each faculty member. These courses serve different purposes:

Self-Study Research: First year students who have not been assigned a permanent advisor may register for the appropriate section of this course with the approval of the ECE Graduate Program Director. Students may register for a maximum of 9 credits per semester in order to maintain full-time status. The grade of P is given for Self-Study Research, but the credits do not count towards MS

or PhD degree course requirements.

Thesis/Dissertation Research: This course may be taken for 1 to 18 credits each semester while the student is engaged in research for the MS thesis or doctoral dissertation under the supervision of their permanent research advisor.

Independent Study: Individualized study under the direction of a faculty member must be arranged in advance between a student and a faculty member with mutual consent and agreement on the requirements for earning the credits. With the approval of the ECE Graduate Program Director and the CEAS Graduate Office, a student may register for a maximum of 6 credits per semester in order to maintain full-time status. Approval of each Independent Study course requires the following:

- Written consent by the student's research advisor.
- Submission of a syllabus, plan of study and grading basis signed by the student and the faculty teaching the class.

One 3-credit Independent Study course may be counted as an elective course in satisfying a student's graduate coursework requirement.

Doctoral Dissertation Proposal: Individualized study and research taken for 1 to 6 credits per semester for the purpose of preparing the doctoral dissertation proposal and its defense before the student's doctoral advisory committee. A maximum of 6 credits may be counted towards the total credit requirement. This should not be used on a regular basis in place of Thesis/Dissertation Research.

9 Graduation

Students may graduate at the end of any semester including the summer semester provided they meet the necessary degree requirements and all Department and University deadlines. Students need not be registered for any courses in the semester in which they graduate provided that they have been registered for at least one credit at the graduate level in their graduate program in the academic year in which they are graduating. All international students must maintain a minimum registration of 1 credit hour every academic semester (Fall and Spring) until graduation.

The initial step in the graduation process consists of the student formally applying for graduation. Applications can be done online at http://www.grad.uc.edu/graduation.aspx This must be done by the announced deadline. A deadline schedule can be found at http://www.grad.uc.edu/graduation-deadlines.aspx. If the student is unable to meet all of the graduation deadlines, they must reapply at the beginning of the following semester in order to graduate in that semester. There is a fee to apply for graduation. Students must pay the fee every time they apply for graduation. The fee is non-refundable if the student fails to meet the graduation deadlines.

The graduation process for MS and PhD includes:

- Following and completing all the guidelines found at the graduate school web site at http://www.grad.uc.edu/graduation.aspx and all guidelines required from the CEAS at http://www.ceas.uc.edu/Graduate_Studies/CurrentStudents/GraduationRequirements.html
- Resolving all grade issues on record. The Department must certify not only that students have met all degree credit requirements, but that any grades of I, IP, SP, and NG have been resolved. Graduating with any of these or an F grade on the transcript requires a special waiver petition to the Graduate School, which is frequently denied.
- Meeting with the thesis/dissertation advisor and deciding on an acceptable date and time for the final defense. Verifying with the committee members that they all will be available. Scheduling a room and confirming the scheduling of the defense in writing with the advisor and committee.
- Submitting a Public Notice of Final Defense of Thesis/Dissertation form. For PhD students, this notice must be given two weeks prior to the final defense. For the MS degree, the public notice must be submitted one week in advance. If notice is not given, the thesis/dissertation defense is not considered valid. Public notices are also required to be posted on the graduate school website at www.grad.uc.edu. They must be posted on this website 2 weeks prior for PhD and one week prior for MS.
- Preparing completed copies of the thesis/dissertation including all chapters and sections appropriately numbered, and all figures, tables, equations, etc. in final form (subject to committee recommended changes). The thesis/dissertation must be prepared in accordance with University guidelines. The student should consult these guidelines before writing the thesis or dissertation. Guidelines can be found at http://www.grad.uc.edu/index.cfm?fuseaction=home.ETDSubmission.
- Delivering a final copy of the thesis/dissertation to each member of the committee at least one week before the defense for an MS thesis and at least two weeks before for the defense of a doctoral dissertation.

- Submitting the thesis or dissertation through Blackboard on SafeAssign. Approval of the SafeAssign from the student's advisor must be obtained to graduate.
- Obtaining instructions on electronic submission and downloading the necessary forms from http://www.etd.uc.edu/ . Additional help is available at gradhelpdesk@uc.edu
- At the defense, the following forms must be signed by the committee and the advisor:
    - The Committee Approval Form generated at http://www.grad.uc.edu/Roadmap/
    - ECE Thesis or Dissertation Defense Form located at http://www.ceas.uc.edu/content/dam/ceas/documents/EngGrad/CEAS_Defense_Forms2010.pdf
- All final corrections required by the advisor and committee must be incorporated in the thesis/dissertation before electronic submission and binding can take place. The final corrected version must be submitted in electronic form in accordance with the instructions provided by the CEAS Graduate School.

In order to graduate at the end of the semester, a student must complete all the above steps and meet all the above deadlines.

MEng students who have applied to graduate submit a graduation package online, which includes the final capstone report, the final program of study form, and the code of conduct form on the CEAS student portal. The CEAS student portal link is https://www.ceas3.uc.edu/CeasStudentPortal/.

Graduation forms are uploaded in the graduation tab. The graduation package is typically due two weeks prior to graduation. The ECE Graduate Program Director certifies to the CEAS Graduate School that all requirements have been met before the student can graduate.

Finally, every doctoral candidate is expected to attend the hooding ceremony preceding commencement. At this ceremony, the advisor hoods the student as a mark of the distinction accompanying the doctorate.

10 Financial Aid

The Department of Electrical and Computer Engineering awards tuition scholarships to incoming and continuing students for the purpose of assisting them in the pursuit of their degree objectives. Some students may be awarded an Assistantship in addition to the tuition scholarship. Descriptions of the Assistantships and tuition scholarships are given below.

10.1 Graduate Assistantship (GA)

Graduate assistantships – including Graduate Teaching Assistantships (TA) – are available to qualified full-time ECE graduate students including incoming first year graduate students and are normally accompanied by a full-time tuition scholarship. The Graduate Assistant is required to provide at least 20 hours per week of service in teaching, research, and/or other work as stipulated in the award. The student is expected to carry out assigned duties in a professional manner, regardless of what those duties may be. These assistantships are usually for a 9-month or 2-semester period with the possibility of the student earning additional compensation during the three summer months. ***Continuation of the assistantship award beyond the initial 9-month or 2-semester period is not implied in the original award.***

Appointments and renewals are determined by the ECE Graduate Program Director or another designated ECE faculty member in consultation with the Graduate Council on the basis of the Department's needs in teaching and research as well as the student's performance and availability of funds. The student must normally register for at least 15 program approved graduate credits per semester to receive this award. Failure to register full-time may result in the student repaying all funds received. Students on reduced load after completing their graduate coursework must get explicit written approval from the CEAS Graduate Office in order to be considered for a TA or GA. Students with more than 174 credit hours completed are not eligible to receive a GA or TA.

10.2 Research Assistantship (RA)

Research assistantships are available as a result of grants and contracts obtained by faculty members doing sponsored research. RA appointments are available for graduate students to participate in particular research projects, which may often serve as thesis/dissertation research topics. Many RAs go to students who have finished one year of study in the department but first year graduate students with strong research potential may also be considered.

These assistantships are normally awarded either for 9 months (sometimes with the possibility of additional compensation during the three summer months) or for 12 months. Appointments for a shorter term are also possible. A tuition scholarship usually accompanies a research assistantship but the semester general fee and health insurance premium are not included.

Awards are made directly by the faculty member leading the research project in consultation with the ECE Graduate Program Director. The RA is required to devote at least 20 hours per week of effort to the research project to which they are assigned. Continuation or termination of the appointment is decided by the faculty advisor and/or principal investigator on the basis of the availability of funds and the student's progress in research and academic areas. The student will be notified by letter of the amount and period of support. Students with RA positions must be registered full-time unless they have reached the maximum number credit hours of 174, after which they may be on reduced course load.

10.3 Graduate Incentive Award (GIA)

The Department awards tuition scholarships (GIA) that pay for all or part of the full-time tuition but do not cover the general fee, the Information Technology and Instructional Equipment fee, or the premium for student health insurance, all of which must be paid by the student. The GIA is awarded each semester and is not available in the summer semester.

Awarded by the ECE Graduate Program Director in consultation with the Graduate Council, GIA is available to qualified full-time MS/PhD graduate students in the Department on a competitive basis. The student must register for at least 15 program approved graduate credits per semester and the GIA may be renewed each semester or on a yearly basis, subject to availability of funds, the student's progress, and completion of the degree requirements. If a student is not registered for 15 program approved graduate credits, the GIA can be removed at any time during the semester and the student will be responsible for any fee and penalties incurred due to the removal of the GIA.

GIA Course Load Guidelines

- GIA recipients must be registered for 15 graduate credit hours in the College of Engineering and Applied Science (CEAS).
- Students can register for up to a maximum of 18 credit hours as part of their GIA. Costs for more than 18 credit hours will be the responsibility of the student.
- GIA recipients must maintain a 3.0+ grade point average (GPA.) If a student drops/withdraws from classes and falls below 15 credit hours after the 14th day of an academic term, the GIA will be removed and the student may be required to pay 100% of tuition and fees.
- International students on reduced course load must be registered for one credit hour in their program EVERY academic semester until they graduate or are on Optional Practical Training (OPT.)
- PhD students who receive more than 4 semesters of GIA funding cannot change to the MS program without permission of the advisor and the Graduate Program Director.
- Students who have taken 174 credit hours thereafter become ineligible to receive a GIA.
- Students must be registered each academic semester if they are on campus. The only time a student does not have to be registered is if they will not be on campus at all during the semester.
- Students on CPT must be registered for the duration of their CPT.
- If a student wishes to drop and add classes, the class should be added BEFORE dropping a class. When adding/dropping classes, students ***must not*** go below 10 credit hours or above 18 credit hours even temporarily to avoid the risk of automatically triggering complications. Adding/Dropping courses can be done online during the first 7 days of the term. After day 7 it is best to do this on an add/drop form.
- If a student wishes to register for any course outside of their program/college, they must request permission to enroll using a change form. The request must include a justification for the request and include a signature from the student's advisor and the Graduate Program Director. The completed form should be submitted to the CEAS Graduate Office for approval.

Failure to comply with this will result in the cancellation of the GIA.

Please see the CEAS Graduate Program Coordinator in 665 Baldwin Hall if you have any questions regarding any of these issues.

10.4 Excessive Credit Hours

The Ohio Board of Regents denies state subsidy for graduate students who have earned more than 174 graduate credit hours. Graduate students whose graduate credit hours at the University of Cincinnati exceed 174 are not eligible for financial aid from general funds (GIA or GA).

10.5 Summer Support

The University of Cincinnati awards Summer Research Fellowships to a number of full-time graduate students in the summer for two-month duration. Fellowships are awarded on a competitive basis based upon proposals for research projects, the student's academic record, and faculty recommendations. Students are required to submit a report to the University Dean's Office after the summer semester, detailing the accomplishments under the Fellowship. Information regarding the Summer Research Fellowships will be sent out to the student email listserv in December/January each year.

10.6 Renewal of Financial Aid

Financial awards are made for a fixed term with the possibility of renewal if 1) sufficient funds are available, 2) the student is making satisfactory research progress, and 3) subject to the Department's needs in teaching and research. The receipt of an award does not imply a commitment by the Department for subsequent awards. In particular, teaching and research assistantships are awarded for a specified period with the term and amount of the award included in the letter of offer to the student. If there is to be a continuation of the award beyond the specified period, the student will be advised in writing with a subsequent letter of offer. The awarding of financial aid, either as a new award or the continuation of previous support, is subject to the availability of funds and any restrictions that may apply.

The funds for GA, GIA, and Doctoral GIA are allocated to ECE every year by the University on a competitive basis, based on the quality of graduate studies and research in the Department. The best assurance that a student has regarding financial assistance is to devote their best efforts toward high scholastic achievement and the best possible progress toward the completion of the degree objective.

Since school funds for teaching assistantships are very limited while funding from grants and contracts is more extensive, students should discuss the possibilities for research assistantship support with faculty members when considering the selection of a permanent research advisor.

11 Advising

11.1 The Research Advisor

Every MS or PhD student must choose a faculty advisor to guide their thesis/dissertation research. Each degree program will choose one or more faculty advisors to temporarily assist new students and each student will be assigned one of these temporary advisors. The student will keep this advisor until they have been accepted as a student by a permanent research advisor. Unless otherwise specified, the temporary advisor for MS and PhD students is the ECE Graduate Program Director.

Choosing a permanent advisor is one of the most important things a student will do, and so this choice should be made carefully, with both student and advisor taking into account the research interests and preparation of the student, the courses the student has taken in the Department so far and their performance in these courses, the research interests of the advisor, and the ability for student and advisor to interact successfully with one another. Each degree track will provide opportunities for first- year students to learn about the work being done by the faculty in that area, usually through the seminar course. Students are also encouraged to make appointments with individual faculty members to discuss their research projects and the prospects for the student's participation in that work. The student is responsible for completing all required courses and other requirements necessary to obtain the degree they are working toward.

A student may choose a permanent faculty advisor as soon as they wish but the process must be complete by the end of the student's second full semester at UC (typically the Spring semester of their first year). Once an advisor is identified, an Advisor Change Form available on the CEAS Student Portal must be completed. This form must be signed by the new advisor and the department's Graduate Program Director and submitted to the Graduate Studies Office at engrgrad@uc.edu or in person at 801 Mantei Center. If a student cannot identify an advisor within one calendar year (from the first day of classes in the semester in which they were admitted), they will not be permitted to continue in a thesis-based MS or PhD program and will have to either convert to MEng or leave the graduate program.

The chosen faculty advisor must be a faculty member with a full, joint, or secondary appointment in the ECE Department. If the research advisor has a secondary appointment in ECE, the student must choose an additional ECE faculty member as their academic advisor, who will work jointly with the research advisor to guide the student, and will be a member of the student's thesis/dissertation committee.

11.2 Change of Advisor

If a student chooses to change advisors, an Advisor Change Form must be submitted. This form must be signed by ***both*** the current advisor and the proposed new advisor. No requests for changes will be considered without such approval. ***The current advisor may require the student to complete specific remaining work, including any work for which the student has received a Research Assistantship***. In some cases, a change in advisors may affect the financial aid the student is receiving. The Graduate Program Director will sign the change request form only after the student, the current advisor and the new advisor have both signed the change request form. The form should then be submitted to the CEAS Graduate Office where it will be placed in the student's Department file. Individual cases

which cannot be resolved according to these procedures will be referred to the Graduate Council for resolution.

If an advisor and/or student wishes to terminate an advising relationship without a new advisor having been identified, the Graduate Program Director will meet with the student and the advisor to understand the reasons. If the termination was initiated by the student, the advisor may require the student to complete specific remaining work, including any work for which the student has received a Research Assistantship. In some cases, leaving an advisor may affect the financial aid the student is receiving. Once the termination is final, the student will have two full, contiguous semesters (Spring, Fall, or Summer semesters) to secure a new advisor, failing which, they will not be permitted to continue in the thesis-based MS or the PhD program.

11.3 Advisor for MEng Students

Students in the MEng program will be assigned an advisor at the time of initial Orientation and will continue being advised by this advisor for the duration of their program. By default, this advisor is the ECE MEng Program Director. However, students may choose to do their capstone project under the guidance of any ECE faculty member.

11.4 Advisor for Part-time Students

Part-time students should follow the procedures listed in Section 11.1 to find a permanent faculty advisor. Part-time students may initiate the search near the completion of their required course work but must have their faculty advisors chosen by the time they finish the course requirements for the degree.

11.5 Duties of the Advisor

While the student is encouraged to consult with other members of the faculty with regard to thesis/dissertation work, the faculty advisor has final authority and responsibility to guide the student's research work as they believe appropriate. The steps for formation of the MS thesis and PhD dissertation committees are listed below in Sections 4.5 and 7.5 respectively.

The primary responsibilities of the faculty advisor are:

- Developing a program of study in cooperation with the student according the rules specified in this handbook. The program must be approved by the ECE Graduate Program Director.
- Reviewing the student's progress and revising the program of study (if required) each registration period.
- Submitting recommendations (positive or negative) for financial aid for the student to the Graduate Program Director.
- Working with the student in writing their Annual Performance Review.
- Guiding the student in the performance of their research and ensuring that they are making progress towards the goals stated in the student's Annual Performance Review.
- Ensuring that the student makes sufficient timely progress in their research to meet the requirement of the Qualifying Publication at the designated time.
- Working actively with the student on their Qualifying Publication and, if necessary, supporting the student in presenting their paper.
- Helping the student to form their thesis/dissertation examining committee.

- Helping to arrange the doctoral proposal defense and reporting the results to the CEAS Graduate Program Coordinator.
- Helping to arrange the thesis/dissertation defense and reporting the results to the CEAS Graduate Program Coordinator.

12 Practical Experience and Training

12.1 Practical Experience - 1 credit hour

The required Practical Experience credit provides the graduate student with the opportunity to gain experience by either working off-campus with a company or on-campus. It is a required course for all MS and PhD students, requiring one semester of work, and should only be done once all course requirements are completed. The CEAS Graduate Coordinator must pre-approve the suitability of the experience (relation to the thesis/dissertation topic), employment period, and assign a Pass/Fail grade at the end of the semester or upon completion of the practical experience.

The student's advisor can waive the off-campus industrial requirement and allow on-campus practical experience such as classroom teaching, applied work, STEP program, etc. Work done as part of the student's thesis or dissertation research, or other research in their advisor's lab, cannot be counted as practical experience. ACCEND students may count one of their co-ops as satisfying the Practical Experience requirement. If the student is an international student and will be working off campus, they must follow the curricular practical training (CPT) procedures described below. The three-month time period used to complete Practical Experience will count as part of the total CPT allowable by the College. Forms can be found at:
http://www.ceas.uc.edu/Graduate_Studies/CurrentStudents/GraduateSchoolForms.html

12.2 Curricular Practical Training (CPT)

Definition: CPT is authorized and defined by the United States government in the Code of Federal Regulation (C.F.R), Title 8, Section 214.2 as:

> "Curricular practical training. An F–1 student may be authorized by the DSO to participate in a curricular practical training program that is an integral part of an established curriculum. Curricular practical training is defined to be alternative work/study, internship, cooperative education, or any other type of required internship or practicum that is offered by sponsoring employers through cooperative agreements with the college. Students who have received one year or more of full time curricular practical training are ineligible for post-completion academic training. Exceptions to the one academic year requirement are provided for students enrolled in graduate studies that require immediate participation in curricular practical training. A request for authorization for curricular practical training must be made to the DSO. A student may begin curricular practical training only after receiving their Form I–20 with the DSO endorsement." [8 C.F.R. 214.2 (f) (10) (i)]

The University of Cincinnati International Student Services Office (ISSO) and the College of Engineering and Applied Science (CEAS) restate C.F.R. 214.2 (f)(10)(i) as:

> "Curricular Practical Training is an employment option available to F-1 students where the practical training employment is considered to be an integral part of the curriculum or academic program. According to United States Citizenship and Immigration Services regulations, this employment may be an internship, cooperative education job, a practicum, or any other work/study experience that is either required for the degree (as defined in the course catalog) or for which academic credit is awarded. The employment must be offered by sponsoring employers through cooperative agreements with the school."

Policy: Consistent with the Code of Federal Regulations, the University, and the College of

Engineering and Applied Science Graduate Office, the Department of Electrical and Computer Engineering will approve Curricular Practical Training for an ECE graduate student for a period no longer than three contiguous months to satisfy the Practical Experience course requirement and/or to acquire quantitative information required for a thesis or dissertation where the information cannot be acquired at the University of Cincinnati or other easily accessible locations. Any further extension of CPT requires certification that the employment is integral to and necessary for the completion of the student's thesis or dissertation research.

Note that this view implies the student is not participating in CPT for the purpose of financial support, gaining industrial experience, trying out for future full-time employment, or performing a service for the CPT employer (although the employer usually sees the student in this light.) The student is also not participating in CPT to acquire general or specific knowledge in a technical area.

Constraints and Requirements:

***Constraints*:** CPT for MS (thesis) students is limited to 25 weeks, and for PhD students to 50 weeks. It must be approved by the advisor, ECE Graduate Program Director, ECE Department Head, and CEAS Associate Dean for Graduate Studies. MEng students may be eligible for 25 weeks of CPT, and should check the College MEng Handbook for instructions on application.

***Requirements during the CPT*:** The student must register for at least one research credit per semester of CPT. The student's thesis/dissertation advisor or the ECE Graduate Program Director can cancel the training at any time due to insufficient progress in thesis/dissertation work.

***Requirements following the CPT*:** The student attending CPT shall identify (e.g., specific references to thesis/dissertation text, tables, figures, etc.) to the ECE Graduate Program Director in writing or email the specific information gathered from the CPT that was required to complete the research investigation.

Application Procedure:

Students must apply for CPT a minimum of two weeks before the CPT start date and follow these steps:

- Obtain an employer letter with the format shown below
- Register for Practical Experience credit if completing CPT for the Practical Experience requirement
- Read and understand information found at http://www.uc.edu/international/services/students/employment/cpt.html
- Complete the **iBearcatsGLOBAL** request https://ibearcatsglobal.uc.edu/istart/controllers/start/start.cfm
- Complete the **iEngineering** request: https://www.ceas3.uc.edu/iEngineering/

Format and Content Requirements for the Application Package:

1. **Employer Letter:**

   A signed letter on company letterhead from the employer is required in the application package. At a minimum the letter must include:

   - Concurrence with the proposed work. A job description composed of the tasks outlined in the proposal for the CPT site; the letter must state that the student's

tasks are consistent with, and in support of, the student's thesis/dissertation research.

- A start date and an end date for the appointment that matches the timeline of the proposal.
- A statement indicating that the company will comply with the federal requirements for CPT by following the agreed work plan, and deviations from this plan will not be made without UC approval.
- A clear statement that all information pertinent to the student's thesis/dissertation obtained while the student is on CPT and obtained using company resources shall be unconditionally released for use and publication in published research papers and the thesis or dissertation.

2. ***Detailed Proposal*** (only needed if not being done for Practical Experience credit) :

The detailed proposal describes the scope and nature of the work during CPT that applies to the student's thesis/dissertation. The proposal must clearly justify the essential need for CPT to complete the thesis/dissertation. At a minimum, the proposal must have the following sections:

- ***Goals and Objectives*****:** These must be clearly defined.
- ***Literature Review*****:** A thorough literature review justifying the need for the work.
- ***Research Accomplished*****:** A detail description of the progress that has been made at UC toward fulfilling the thesis/dissertation objectives.
- ***Proposed Work*****:** A detailed description of the proposed research work with a description of tasks to be accomplished for each project objective. The tasks must be presented as a list with a detailed description for each task and a projected timeline. Each task that is planned for completion at the CPT site must be identified, and a justification for each must address two questions: 1) Is this task essential for completing the thesis/dissertation? and 2) Why is it necessary to go to the proposed CPT site to complete the task?
- ***Timeline*****:** A timeline for each task as described above and an overall degree timeline.

13 ECE MS Thesis and PhD Dissertation Awards

To promote research excellence and inspire graduate students, the Department of Electrical and Computer Engineering has established the following awards:

- ECE Outstanding MS Thesis Award
- ECE Outstanding PhD Dissertation Award
- ECE Graduate Service Award
- ECE Outstanding Graduate Assistant Award

In addition, up to three runners-up in each category (MS Thesis or PhD Dissertation), depending upon the recommendation of the award committee, will receive a "Certificate of Merit." These awards will be presented at the ECE Annual Honors and Awards Ceremony. The eligibility requirements and the procedures for each award are as follows:

- In order to be eligible for the award, the student must have completed all requirements for the MS or PhD degree and passed the MS thesis/PhD dissertation oral defense examination during the calendar year ending with the Spring semester during which the awards ceremony is held.
- A committee appointed by the ECE Graduate Program Director will review all nominations and select one student in each category for each award. Up to three runners-up in each category, as recommended by the committee, will receive a "Certificate of Merit."

Any member of the faculty can make a nomination for these awards by submitting a nomination letter that includes:

- Name of the student being nominated
- Award for which the student is being nominated
- Thesis/dissertation title and abstract (if award nomination is for Outstanding Thesis/Dissertation)
- Brief justification for the nomination

The award recipients will be selected based on the overall quality and the demonstrated impact of the contributions made by the students' work.

14 Continuation and Dismissal

14.1 Completion of Thesis/Dissertation Research

It is expected that the research done for either degree (MS/PhD) and the resulting thesis or dissertation will be completed while the student is still in full-time residence, and this is especially to be expected of those students who have received financial aid. Departure before final acceptance of the thesis or dissertation generally results in long delays before completion, in some cases so long that the work has been superseded by the work of others and may no longer be acceptable to meet the requirements. Foreign students must, of course, maintain full-time status and remain in residence until all requirements for the degree are met.

In those instances where unusual circumstances exist and the student wishes to complete their degree while no longer in residence, the student must provide adequate justification and secure in advance both the advisor's and the ECE Graduate Program Director's concurrence in writing. The student and the advisor must also agree on a timetable to complete the degree. Failure to do so can result in the advisor's resignation and/or the student being considered as withdrawn from the program.

14.2 Continuation

A student may continue in the Department as long as reasonable progress is being made toward the degree. From an academic viewpoint, this means that the student's record in graduate course work, exclusive of thesis/dissertation research and seminars, continues to exhibit an average of B or better, that I grades appear only infrequently and for good cause, and that such grades are converted into acceptable grades within one year, and preferably within the next semester. If reasonable progress is not being made, the ECE Graduate Program Director will inform the student in writing that their progress is inadequate. Further, the ECE Graduate Program Director will include in the written communication steps that must be undertaken to return status as a student in good standing in the program. A student who does not return to good standing within the stipulated period will be dismissed from the graduate program.

14.3 Dismissal

Dismissal of the student from the graduate program of the Department of Electrical and Computer Engineering will occur if they fail to maintain a B average or the proper distribution of grades. After one semester of performance below B average or when it becomes obvious that a satisfactory distribution of grades is not being achieved, a student will be warned by a letter from the ECE Graduate Program Director that their performance is below standard and, if continued, will result in dismissal. If substantial improvement as specified in the letter does not occur by the deadline stated in the letter, the student will be dismissed from the graduate program.

It is expected that the student will conduct their relationships with faculty and other students in a professional manner. If it is determined that a student has been dishonest in completion of coursework, writing of an exam, or the writing of a research paper or any other assessable work product, the relevant faculty member should use the academic misconduct notification form provided by CEAS to notify the student of the allegation, meet with the student to resolve it, and then report the outcome to the CEAS Assistant Dean of Undergraduate Academics using the CEAS academic misconduct resolution form. For further information on the process, faculty may contact the Graduate

Program Director or CEAS Assistant Dean of Undergraduate Academics.

Persistent nonprofessional activities or activities detrimental to the Department's reputation may result in a student's immediate dismissal from the graduate program.

15 Special Rules

15.1 Nondiscriminatory Policy

The Department of Electrical and Computer Engineering affirms University policy that discrimination on the basis of race, color, religion, national origin, sex, sexual orientation, disabilities, or age will not be practiced or tolerated in its activities. Complaints involving discrimination should be directed to the ECE Graduate Program Director and/or the ECE Department Head.

15.2 Right to Review Records

Students, once enrolled, have the right to review their educational records, except for those excluded by law, such as those maintained by a physician or psychiatrist or a parent's financial statement. Records are maintained in such offices as UC Student Records, College of Engineering and Applied Science Dean's Office, the Office of the Vice President for Research and University Dean for Advanced Studies, Student Financial Aid, Career Development and Placement, and Educational Advising, and the Department of Electrical and Computer Engineering Office. To review records and any appropriate explanation, the student should address the proper office. In ECE, students must submit a request to the Graduate Program Director. If the student feels there are inaccuracies, they may place a letter of explanation in the file.

15.3 Academic Honesty

Academic dishonesty in any form is a serious offense and cannot be tolerated in an academic community. Dishonesty including cheating, plagiarism, deception of effort, or unauthorized assistance, may result in a failing grade in a course and/or suspension or dismissal from the Division of Research and Advanced Studies). The University's *STUDENT CODE OF CONDUCT* covers all aspects of student academic dishonesty and misconduct and specifies possible sanctions or penalties. Disciplinary procedures are detailed, as are procedures for the appeal of decisions

15.4 Grievance Procedures

In those instances where a student objects to actions taken by the Department of Electrical and Computer Engineering or any of its faculty, they are advised to discuss those objections with the faculty member(s) involved, the ECE Graduate Program Director, and/or the Department Head. Where a mutually acceptable solution is not possible, procedures for the redress of grievances are detailed in the UC *Graduate Student Grievance Procedures Manual*:

http://grad.uc.edu/student-life/policies/grievances.html

Each student will receive a copy of these procedures at the time they first register as a graduate student in ECE. Additional copies are available from the University of Cincinnati Graduate School. The ECE Department affirms its adherence to these procedures.

15.5 Change of Degree Requirements

Any student in an ECE graduate degree program must, at a minimum, meet all requirements for the appropriate degree that were in effect when the student first registered for the program.

16 Planned ECE and CS Course Offerings for 2025-2026

Fall Semester

EECE 6007	Biomedical Microsystems
EECE 6008	Fundamentals of MEMS
EECE 6016C	Electric Machines and Drives
EECE 6018	Microfabrication of Semiconductor Devices
EECE 6019	Probability and Random Processes
EECE 6021	Haptics and Collaborative Robotics
EECE 6023C	Security & Trust for Cyberphysical Systems
EECE 6024	Intro to Digital Signal Processing
EECE 6029	Distributed Operating Systems & Algorithms
EECE 6030	Trust in Digital Hardware
EECE 6032	Software Testing and Quality Assurance
EECE 6036	Intelligent Systems
EECE 6042	Digital Image Processing
EECE 6044C	Introduction to Mechatronics
EECE 6046	Principles & Practices of Evolutionary Computing
EECE 6048C	Optics for Engineers
EECE 6051	Intro to Sensors
EECE 6053	2D/3D Printing Technologies for Electronics/Optoelectronics
EECE 6054	Cryptography: Theory and Engineering
EECE 6055	Power System Protection
EECE 6062C	Solar PV System Fundamentals
EECE 6080C	Introduction to VLSI Design
EECE 6088	Nanoelectronic Devices for VLSI Technologies
EECE 7001	EECE Seminar (Required)
EECE 7004	Practical Experience
EECE 7080	Self-Study Research
EECE 9060	EE MEng Capstone
EECE 9061	CompE MEng Capstone
EECE 9080	Doctoral Dissertation Proposal
EECE 9089	Thesis or Dissertation Research

CS 6030	Advanced Software Engineering
CS 6033	Artificial Intelligence
CS 6035	Learning Probabilistic Models
CS 6037	Machine Learning
CS 6039	Operating Systems
CS 6043	Computer Networking
CS 6051	Database Theory
CS 6052	Intelligent Data Analysis
CS 6054	Information Retrieval
CS 6055	Cyber Defense Overview
CS 6065	Introduction to Cloud Computing

CS 6067 User Interface I
CS 6070 The Theory of Formal Languages and Automata
CS 6072 Network Science
CS 6073 Deep Learning
CS 6101 Intro to Applied AI and Machine Learning Tools (not open to CS/ECE students)
CS 7005 Advanced Special Topics in Computer Science
CS 7051 Advanced Topics in Mining Spatial and Temporal Data
CS 7053 Intro to Medical informatics
CS 7064 Trustworthy Machine Learning
CS 7081 Advanced Algorithms I
CS 7097C Intro to Functional Genomics

Spring Semester

EECE 6006C Biomedical Instrumentation
EECE 6015C Instrumentation & Industrial Control
EECE 6022C Quantum Computing
EECE 6025 Power Electronics
EECE 6028C Intelligent Machine Design
EECE 6029 Operating Systems
EECE 6034C Trustworthy Hardware
EECE 6035 Information Theory
EECE 6041C Microfabrication Lab
EECE 6046 Principles & Practices of Evolutionary Computing
EECE 6051 Intro to Sensors
EECE 6082C VLSI Design for Test & Power
EECE 6083 Compiler Theory & Practice
EECE 6086C VLSI Design Automation
EECE 7019 Bio-Inspired Robotics
EECE 7031 Advanced MEMS Technologies
EECE 7032 Biosensors
EECE 7033 Linear Systems Theory
EECE 7034 Intelligent Agents
EECE 7036 Neuromorphic Computing for AI
EECE 7065 Complex Systems & Networks
EECE 7075 Principles of Modern Networking
EECE 8025 EE of the Human Body
EECE 7002 EECE Seminar (Required)
EECE 7004 Practical Experience
EECE 7080 Self-Study Research
EECE 9060 EE MEng Capstone
EECE 9061 CompE MEng Capstone
EECE 9080 Doctoral Dissertation Proposal
EECE 9089 Thesis or Dissertation Research

CS 6021 Math Logic
CS 6024 Visual Interfaces

CS 6025	Data Encoding
CS 6034	Natural Language Processing
CS 6038	Malware Analysis
CS 6053	Network Security
CS 6056	Security Vulnerability
CS 6062	Intelligent Data Analysis
CS 6065	Introduction to Cloud Computing
CS 6070	Theory of Formal Languages and Automata
CS 6073	Deep Learning
CS 6074	Software Architecture
CS 6101	Intro to Applied AI & Machine Learning Tools (not for CS or ECE students)
CS 7003	BMI Seminar
CS 7005	Advance Special Topics in CS
CS 7029	Advanced Network Design
CS 7054	Data Science Biomedical Research
CS 7063	Advanced Methods in Machine Learning
CS 7071	Advanced Database Management
CS 7072	Matrix Methods for Data Science
CS 7081	Advanced Algorithms 1
CS 7082	Advanced Algorithms 2
CS 7099	Intro to Bioinformatics

17 ECE and CS Faculty Lists

Electrical and Computer Engineering Faculty

	Rank	Primary	Research Areas
Ahn, Chong H.	Professor	ECE	BioMEMS, BioSensors
Bahk, Jae-Hyeong	Associate Professor	ECE/MME	Thermoelectrics, Energy Harvesting
Cahay, Marc M	Professor and Dept Head	ECE	Spintronics, Nano-Electronics
Chiou, Fred Yauh-Huei	Assoc Professor - Educator	ECE	
Dai, Rui (April)	Assoc Professor	ECE	Multimedia Communications and Networks
Emmert, John Martin	Professor and Dean	ECE	Chip Design, Hardware Security
Ettorre, Stephen	Assoc Professor - Practice	ECE	
Fuchs, Zach	Asst Professor	ECE	Autonomous Systems, Game-Theoretic Systems
Gallagher, John	Professor	ECE	Cyberphysical Systems, Evolutionary Computing
Han, Daewoo	Assistant Professor	ECE	Nanofibers, Bio/Chem/Medical/Sensor Devices and Materials
Helmicki, Arthur J	Professor and Associate Dean	ECE	Controls, Unmanned Vehicles
Hu, Yiming	Assoc Professor	ECE	Peer-to-Peer Computing
Hunt, Victor	Assoc Professor - Research	ECE	Controls, Unmanned Vehicles
Jha, Rashmi	Professor	ECE	Neuromorphic Systems, Cybersecurity
Jone, Wen Ben	Assoc Professor	ECE	VLSI Design for Testability
Kim, Yeongin	Asst Professor	ECE	Wearable Sensors, Implantable Devices
Li, Tao	Assoc Professor	ECE	MEMS, Microsensors
Lorenz, Tamara	Assoc Professor	ECE/MME /Psych	Human-Machine Interaction, Human Joint Action
Minai, Ali A	Professor	ECE	AI, Bio-Inspired Systems
Mittal, Ankit	Assistant Professor	ECE	Integrated Circuits, Ultra Low Power Radios
Nitin, FNU	Assoc Professor - Educator	ECE	
Niu, Nan	Assoc Professor	ECE	Software Engineering, Requirements Engineering
Norouzi, Mehdi	Assoc Professor - Educator	ECE	Machine Learning, Systems

Novak, Vesna	Assoc Professor	ECE	Human-Robot Interaction, Serious Games, Affective Computing
Rabiee, Max	Professor	ECE	Electric Machines and Drives, Automation
Salah, Ameer	Asst Professor - Educator	ECE	
Steckl, Andrew	Professor	ECE	Microelectronics, Bioelectronics
Tayahi, Moncef Ben	Assoc Professor - Educator	ECE	
Vanderelst, Dieter	Assoc Professor	ECE/MME /Biol	Bio-Inspired Robotics
Vellambi, Badri	Asst Professor	ECE	Information Theory, Reinforcement Learning
Vemuri, Ranganadha	Professor	ECE	VLSI Design, Hardware Trust and Verification
Wang, Boyang	Asst Professor	ECE	Cybersecurity, Cryptography
Wei, Wei	Assoc Professor - Educator	ECE	
Zhou, Xuefu	Assoc Professor	ECE	Wireless communications, Non-destructive evaluations, Computer vision

Computer Science Faculty

	Rank	Primary	Research Areas
Abuaitah, Giovanni	Assoc Professor-Educator	CS	
Annexstein Fred S.	Assoc Professor	CS	Parallel and Distributed Computing
Gowtham Atluri	Assoc Professor	CS	Spatio-Temporal Data Analysis
Aurisano Jillian	Asst Professor	CS	Data Visualization, HCI
Bai, Jun	Assistant Professor	CS	Bioinformatics, AI
Berman Kenneth A	Professor	CS	Graph Theory, Network Algorithms
Bhatnagar Raj K	Professor	CS	Data Mining, Data Analytics
Brahma, Swastik	Assoc Professor	CS	Networked Systems, Human-in-the-Loop Systems
Cheng Yizong	Assoc Professor	CS	
Guan, Chaowen	Assistant Professor	CS	Cluster Analysis, Deep Learning

Hawkins Will	Asst Professor - Educator	CS	
Jiang, Tianyu	Assistant Professor	CS	Natural Language Processing
Lee Seokki	Asst Professor	CS	Databases, Big Data
Ralescu Anca L	Professor	CS	Machine Learning, AI
Ravindra, Vikram	Assistant Professor	CS	Data Science, Machine Learning
Yu, Chong	Assistant Professor	CS	Cybersecurity, AI
Zhan, Justin	Professor and Dept Head	CS	Data Science
Zhao, Yu	Assistant Professor	CS	Software Engineering