



Electrical & Computer  
**ENGINEERING**



Electrical & Computer Engineering

**2017-2018 Ph.D. Catalog/Handbook**

ECE Office of Graduate Affairs

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## WELCOME TO ELECTRICAL AND COMPUTER ENGINEERING

Welcome to the Department of Electrical and Computer Engineering at Carnegie Mellon University, a large and dynamic organization engaged in education, research, and entrepreneurship on a truly global scale, with locations and programs in Pittsburgh, Silicon Valley, Portugal, and Africa. The 2015 US News and World Report ranks our graduate research programs in electrical and computer engineering 8th and 4th in the nation, respectively.

Since offering our first course in electrical engineering in 1908, the Department of Electrical and Computer Engineering has become one of the leading world programs preparing students for a number of diverse careers. Our distinguished faculty includes members of the National Academy of Engineering and works closely with students who come from throughout the United States and the world. Our research and teaching cover a broad spectrum of areas including device sciences and nanotechnology, computer systems, data science, energy, control, communications, and circuits, among others. Our electrical and computer engineers continue to push the boundaries of technology and shape the future of energy systems, hospitals, computers, and many others.

I hope you will browse through this catalog/handbook and our website and learn more about our department. Please contact us if you have any questions or comments.

Sincerely,



Jelena Kovačević  
Department Head, Hamerschlag University Professor  
Electrical and Computer Engineering

## Core Values

The ECE Department has been a leader in both research and education for years; it is known for its innovative qualities, boldness of ideas, and unbridled enthusiasm. Our strategic plan is guided by our core values.

We value scientific truth, creativity, quality, innovation, and engineering solutions, all within a diverse and inclusive community guided by respect and joy of doing.

Our core values form the foundation for what we do; we hold them to be intrinsically true. We believe in solving problems that have large societal impact; we also believe that to be successful, we must work within an environment of enthusiasm and openness, respect and integrity, and freedom to express and explore a variety of ideas.

## Vision

Our vision is our guiding light; it informs and propels us in the right direction. The strategies of following that path change over time; the vision does not.

To be a creative driving force within the university and worldwide of highest scholarly and entrepreneurial quality.

## Mission

Our mission is our “what, who, how”; it explains what we do, who we do it for, and how we do it so we engage the “hearts, heads, and hands” of our faculty, students, and staff in achieving our objectives.

To inspire, educate, and produce electrical and computer engineers capable of tackling fundamental scientific problems and important societal challenges, and to do so with the highest commitment to quality, integrity, and respect for others.

We aim to be the best at what we do, to apply all our skills and knowledge to execute our vision. We educate young people to become engineers sought after by industry and academia alike; we do so in an environment imbued by enthusiasm and love for what we do, with respect and willingness to listen to each other, with freedom to express our ideas and look at challenges from different points of view. We strive to be the ECE department of choice for those who are willing to step off the beaten path, for the visionaries and dreamers.

## INTRODUCTION

### Graduate Degrees and Programs Offered

Master of Science in Electrical and Computer Engineering

- Pittsburgh



- Silicon Valley
- Africa

Master of Science in Software Engineering

- Silicon Valley

Doctor of Philosophy in Electrical and Computer Engineering

- Pittsburgh
- Silicon Valley
- Portugal

## Graduate Student Catalog/Handbook

This catalog/handbook is intended to set guidelines and expectations for new and current doctoral students in Electrical and Computer Engineering at Carnegie Mellon University. This catalog/handbook is not exhaustive and is subject to revision at any time by the ECE department. It covers Ph.D. students in Pittsburgh, Silicon Valley, and Portugal.

It is the responsibility of each student to read and understand the contents of this catalog/handbook.

This catalog/handbook, along with any revisions, will be posted and announced annually to the [ECE website](#). Students with disabilities may request this catalog/handbook in other formats by contacting the Graduate Affairs Office.

## CARNEGIE MELLON POLICIES, EXPECTATIONS, STATEMENT OF ASSURANCE, AND CODE

### Carnegie Mellon Policies & Expectations

It is the responsibility of each member of the Carnegie Mellon community to be familiar with university policies and guidelines. In addition to this departmental graduate student catalog the following resources are available to assist you in understanding community expectations:

- [The Word/Student Catalog](#)
- [Academic Integrity Website](#)
- [University Policies Website](#)
- [Graduate Education Website](#)
- [College of Engineering Website](#)
- Please see Appendix A for additional information about The Word and University resources.

### Carnegie Mellon Statement of Assurance

Carnegie Mellon University does not discriminate in admission, employment, or administration of its programs or activities on the basis of race, color, national origin, sex, handicap or disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status, or genetic information. Furthermore, Carnegie Mellon

University does not discriminate and is required not to discriminate in violation of federal, state, or local laws or executive orders.

Inquiries concerning the application of and compliance with this statement should be directed to the vice president for campus affairs, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213, telephone 412-268-2056.

For general information about Carnegie Mellon University, call 412-268-2000.

The Statement of Assurance can also be found [online](#).

## Carnegie Mellon Code

Students at Carnegie Mellon, because they are members of an academic community dedicated to the achievement of excellence, are expected to meet the highest standards of personal, ethical and moral conduct possible.

These standards require personal integrity, a commitment to honesty without compromise, as well as truth without equivocation and a willingness to place the good of the community above the good of the self. Obligations once undertaken must be met, commitments kept.

As members of the Carnegie Mellon community, individuals are expected to uphold the standards of the community in addition to holding others accountable for said standards. It is rare that the life of a student in an academic community can be so private that it will not affect the community as a whole or that the above standards do not apply.

The discovery, advancement and communication of knowledge are not possible without a commitment to these standards. Creativity cannot exist without acknowledgment of the creativity of others. New knowledge cannot be developed without credit for prior knowledge. Without the ability to trust that these principles will be observed, an academic community cannot exist.

The commitment of its faculty, staff and students to these standards contributes to the high respect in which the Carnegie Mellon degree is held. Students must not destroy that respect by their failure to meet these standards. Students who cannot meet them should voluntarily withdraw from the university.

The [Carnegie Mellon Code](#) can also be found online.

## Carnegie Mellon Child Protection Requirements

Carnegie Mellon is committed to providing a safe and secure environment for all minors involved in any programs or activities conducted on university premises, as well as any off-campus programs or activities sponsored by the university. Details are available through Leonard Gelfand Center [Child Protection Operations](#).

If you have questions regarding Act 153 or encounter a situation when you would need to have the clearances, please contact Meighan at [meighan.harding@ece.cmu.edu](mailto:meighan.harding@ece.cmu.edu).

## DEPARTMENTAL INFORMATION

### University Personnel

Throughout your time in the Ph.D. program, you will encounter a variety of faculty and staff who will help you on your way to completing your degree. You may view a [list of faculty](#) and a [list of staff](#) affiliated with ECE online. Below is a list of faculty and staff whom you are likely to encounter during your time in the Ph.D. program.

- Dean of the College of Engineering: [Professor James H. Garrett](#)
- Associate Dean of Graduate and Faculty Affairs: [Professor Jonathan Cagan](#)
- Assistant Vice Provost for Graduate Education and University Graduate Student Ombudsman: [Dr. Suzie Laurich-McIntyre](#)
- Department Head: [Professor Jelena Kovačević](#)
- Executive Assistant to the Department Head and Administrative Services Manager: [Christina Cowan](#)
- Director, CMU Africa: [Bruce Krogh](#)
- Associate Department Head for Research and Strategic Initiatives: [Professor José M.F. Moura](#)
- Associate Department Head for Academic Affairs: [Professor Diana Marculescu](#)
- Director of Operations: [Meighan Harding](#)
- Associate Director of Finance and Sponsored Research: [Charlotte Ambrass](#)
- Associate Director of Student and Academic Affairs: [Leona Kass](#)
- Associate Director of Graduate Affairs: [Tara Moe](#)
- Advisor, Student Organizations & Activities: [Bari Morchower](#)
- Advisor, Student Organizations & Activities in Silicon Valley: [Brittany Reyes](#)
- Ph.D. Academic Program Advisor: [Nathan Snizaski](#)
- Ph.D./M.S. Academic Program Advisor in Silicon Valley: [Stephanie Scott](#)
- M.S. Academic Program Advisor: [Nesli Ozdoganlar](#)
- M.S. Academic program Advisor: [Jillian McCarthy](#)
- Student Services Officer, CMU Rwanda: [Olga Gikundiro Buki](#)

A general [list of contacts](#) can also be found on the ECE website.

### University Resources

#### Academic Audit

Each student has an academic audit that shows how courses taken or registered for meet the degree requirements. You can find your individual academic audit on The Hub at <https://enr-apps.as.cmu.edu/audit/audit>. Students may also meet with their academic advisor to review how their courses have been applied to the degree requirements.

#### University Resource Websites

Several pertinent university policies are included in this handbook, primarily found in the [University Policies](#) section. The complete university policies are available online at the following link: <http://www.cmu.edu/policies>.

Additional assistance is available in understanding community expectations, with the following resources being particularly relevant to ECE students:

- The Office of the Assistant Vice Provost for Graduate Education. Website: [www.cmu.edu/graduate](http://www.cmu.edu/graduate). Email: [grad-ed@cmu.edu](mailto:grad-ed@cmu.edu)
- The Office of the Dean of Student Affairs. Website: [www.cmu.edu/student-affairs/index.html](http://www.cmu.edu/student-affairs/index.html)
- Student Services in Silicon Valley. Website: <http://www.cmu.edu/silicon-valley/campus-life/index.html>
- Assistance for Individuals with Disabilities. Contact Larry Powell, Equal Opportunity Services, 412-268-2013, [lpowell@andrew.cmu.edu](mailto:lpowell@andrew.cmu.edu)
- Eberly Center for Teaching Excellence. Website: [www.cmu.edu/teaching](http://www.cmu.edu/teaching)
- Graduate Student Assembly. Website: [www.cmu.edu/stugov/gsa/index.html](http://www.cmu.edu/stugov/gsa/index.html)
- Intercultural Communication Center. Website: [www.cmu.edu/icc](http://www.cmu.edu/icc)
- Office of International Education. Website: <http://www.studentaffairs.cmu.edu/oie/>
- Counseling & Psychological Service. Website: [www.studentaffairs.cmu.edu/counseling](http://www.studentaffairs.cmu.edu/counseling).
- Health Services. Website: [www.cmu.edu/HealthServices](http://www.cmu.edu/HealthServices)
- University Police. Website: [www.cmu.edu/police](http://www.cmu.edu/police)
- The Word (student online handbook). Website: <http://www.cmu.edu/student-affairs/theword>
- Academic Integrity Website: [www.cmu.edu/academic-integrity](http://www.cmu.edu/academic-integrity)
- University Policies Website: [www.cmu.edu/policies/](http://www.cmu.edu/policies/)

Please refer to Appendix A for additional information about each of the aforementioned resources.

## Department Resources

### Academic Advisors

Your academic advisor is a resource for having any university paperwork signed, asking questions regarding registration or the curriculum, and guiding you to other important resources. Nathan Snizaski and Stephanie Scott serve as the academic advisors for Ph.D. students.

Academic advising is done through the Graduate Affairs Office. In Pittsburgh this is in Hamerschlag Hall 1113; in Silicon Valley this is in B19 Room 1060. The Ph.D. Academic Program Advisor administratively advises all ECE Ph.D. students throughout the entire duration of the Ph.D. program. While this advisor does not provide content-specific expertise in ECE, he/she helps students navigate through the program by tracking milestones, meeting one on one and in groups with students for questions related to registration or the curriculum, guiding students to other important resources, completing enrollment and university-related paperwork, and answering questions for students who may not know where else to turn. Nathan Snizaski and Stephanie Scott are the Academic Advisors for Ph.D. students.

Nathan can be reached by email: [nsnizask@andrew.cmu.edu](mailto:nsnizask@andrew.cmu.edu), by phone: (412) 268-3200, or in person in 1113 Hamerschlag Hall. To guarantee availability, you are encouraged

to schedule an appointment with him by accessing his [calendar](#) in the signature block of his e-mail. Nathan advises Pittsburgh based Ph.D. and Portugal based students.

Stephanie can be reached by email: [scottsm@andrew.cmu.edu](mailto:scottsm@andrew.cmu.edu), by phone: (650) 335-2853, or in person on the Silicon Valley campus in Building 19 Room 1060. To guarantee availability, you are encouraged to schedule an appointment with her by accessing her [calendar](#) in the signature block of her e-mail. Stephanie advises all Silicon Valley based Ph.D. students.

## Faculty Advisors

Students also receive a faculty advisor. Faculty advisors help guide Ph.D. students through the program by ensuring that all students receive the necessary support and mentoring to succeed.

## Matching

Within the first few weeks of entering ECE, most students are matched with faculty advisors using a “mutual match” process. During orientation, faculty from ECE’s four areas give an overview of available research projects in order to help students find an advisor who aligns with his or her research interests. ECE’s four research areas are:

- Circuits/CAD/VLSI
- Computer Systems
- Device Sciences and Nanofabrication
- Signals, Communications, and Controls

After the area overview, students are required to meet with all the faculty listed on their admission letter and are also welcome to meet with any other faculty member with an ECE affiliation. In addition to attending the orientation presentations, students can learn about an individual faculty member’s research interests by viewing the faculty’s member Curriculum Vitae and website (if available) and from meeting individually with different faculty members during the matching period.

Matching is done through a mutual matching process: students rank their top three [3] faculty preferences and faculty discusses their student preferences. A committee then matches each student with a faculty member, taking into consideration each of their preferences and other factors. Specific information on the matching process can be referenced through the orientation presentation on [Ph.D. Matching with Advisors](#).

Final matches will be communicated to students by the end of the first full month of enrollment.

Some programs have different matching processes. These variations are listed below.

Program	Matching Process
CMU   Portugal Dual Degree Program	CMU   Portugal dual degree students typically enter the program pre-matched based on recommendations from the Program Directors. One advisor will be from CMU and one advisor will be from the student’s home institution in Portugal.

## Silicon Valley

Silicon Valley students are generally directly matched with the faculty advisor listed on the admission letter. Silicon Valley students will still be expected to formalize this relationship by filling out the matching process survey.

### *Expectations*

Faculty advisors are expected to help guide Ph.D. students through the program by ensuring that all students receive the necessary support and mentoring to succeed. Each relationship between a student and his or her faculty advisor is unique and tends to evolve over the course of the student's time in the Ph.D. program. It is the responsibility of both the student and his or her advisor to identify goals, plans, and criteria for success in the Ph.D. program.

Occasionally, students request to switch advisors. While this request must be approved by the Graduate Affairs Office, it is generally viewed as routine and is almost always granted. It is recommended that students pursue such switches early in the Ph.D. program so that their academic progress can continue as it is expected. To switch an advisor, a student must complete the [Change of Advisor form](#).

Faculty advisors must have an ECE affiliation and be able to financially support the student for the duration of their studies.

### *Co-advisors*

It is possible for students to have more than one advisor at the same time. Usually, co-advising is done when a student is pursuing a topic that is interdisciplinary in nature or that would benefit from the expertise of two faculty members. Both advisors must have an ECE affiliation to co-advise an ECE student.

### *Advisor Departure*

In case of advisor departure from CMU, Ph.D. students have the following options:

- Remain with advisor as a CMU student; physically located at CMU
- Remain with advisor as an enrolled CMU student, but work with advisor at his/her new institution
- Remain with advisor and transfer to advisor's new institution
- Find a new advisor at CMU and remain a CMU student

When an advisor leaves the ECE Department, the department will hold an information session for that faculty member's students to discuss this transition and their options.

### **Graduate Studies Committee (GSC)**

The Graduate Studies Committee is a committee consisting of ECE faculty and ex-officio administrators from the Graduate Affairs Office. The Graduate Studies Committee meets throughout the academic year to address student petitions, discuss program policies, and to approve and assign qualifying exams.

The GSC Chair for the 2017-2018 academic year is James Bain. The dates for the GSC meetings will be posted on the [GSC Petitions Procedures website](#) (requires Andrew ID log in) before the start of each semester.

## Bulletin Boards

Pittsburgh campus

- Bulletin boards are located throughout the department in Baker Hall, Porter Hall, Hamerschlag Hall (HH), and Roberts Hall. Bulletin boards will be cleared on a regular basis.

Silicon Valley campus

- Students in Silicon Valley can find bulletin boards located in Buildings 23 and 19. Bulletin boards will be cleared on a regular basis.

## Tech & Receiving

Pittsburgh campus

- The Tech Electronics Shop and ECE Shipping and Receiving Department is located on the Pittsburgh campus in HH 1301 and its regular business hours are 9am-5pm, Monday through Friday. The Tech Electronics Shop offers a wide variety of parts, components, tools, and supplies used throughout the ECE Labs, which are available for use to all ECE students, faculty, and staff. The ECE Shipping and Receiving Department handles all incoming and outgoing packages for the department as well as the daily US Mail delivery. The ECE Shipping and Receiving Department has a large stock of shipping materials to assist with any outgoing package needs, as well as prompt notification of package arrival and delivery if necessary

Silicon Valley campus

- Students on the Silicon Valley campus should work with their instructor if supplies are needed.

## Computer Clusters

Computer clusters are located in HH 1303. There are several remote access compute clusters located in the ITS Cyert Hall machine room. Various research groups or principle investigators have their own compute clusters. Access to those clusters is only available with the consent of the party who owns the cluster. There are not computer clusters available in Silicon Valley.

## Printers

[Printers](#) are provided for student academic use.

Pittsburgh campus

- Andrew Public Printing stations are available in HH A101, A104, 1303, and 1310.

Silicon Valley campus

- Printers are for use in Building 23 (B23) Room 123, the hallway in B23 outside of 109/110, the Building 19 (B19) kitchen/lounge, and at the end of the 1030 wing in B19. Instructions for adding printers and policies are posted next to each printer.

## Keys

### Pittsburgh campus

- All key requests should be sent to [keys@ece.cmu.edu](mailto:keys@ece.cmu.edu) and should be accompanied by your supervisor's approval. Key distribution will take 3-5 business days, assuming a copy of the desired key is on file. If a new key needs to be made, the request could take 7-9 business days. You will receive an e-mail once the key is ready for pick-up and supervisor approval has been received. To avoid any financial implications to you, your key must be returned prior to your final departure from CMU.

### Silicon Valley campus

- The Silicon Valley Facilities will provide you with a key to the Ph.D. study suites in Building 19 at orientation. To avoid any financial implications to you, your key must be returned prior to your final departure from CMU. To report a lost key or to request a replacement, please email [facilities@sv.cmu.edu](mailto:facilities@sv.cmu.edu).

## Lab & Office Space

Lab and office space will be assigned to students once they have been formally matched with a faculty advisor. Lab and office assignments may be modified at the discretion of the students' faculty advisor or the department. Students may not re-locate without prior permission from the department.

## Graduate Student Lounges

### Pittsburgh campus

- The [graduate student lounge](#) in Pittsburgh is located in the top floor of Hamerschlag Hall.

### Silicon Valley campus

- There are several spaces for students in Silicon Valley to use. The main student lounges can be found in B23, downstairs Room 129 and upstairs Room 227. In B19, students can utilize the Bay Room (B19 Room 1040).

## Department Office/Building Security, Repairs and Services

### Pittsburgh campus

- Any damages, repairs, or security concerns should be reported to Alan Grupe, Facilities Manager, by emailing [help@ece.cmu.edu](mailto:help@ece.cmu.edu). In an emergency, please contact University Police at 412-268-2323.

### Silicon Valley



- Any damages, repairs, or security concerns should be reported to Stacy Marshall, Facilities and Events Manager, by emailing [facilities@sv.cmu.edu](mailto:facilities@sv.cmu.edu). In an emergency, please contact NASA Police at 650-604-5555.

## Graduate Student Organizations

- **EGO (ECE Graduate Student Organization)** organizes academic and social events throughout the academic year.
- **WinECE (Women in Electrical and Computer Engineering)** provides academic and social events to women in ECE throughout the year.
- **HKN (Eta Kappa Nu)** is the honor society for Electrical and Computer Engineering students. HKN members engage in community service, professional engagement, and social activities. Ph.D. students are invited by the board of HKN to join based on academic performance.
- **ECE Outreach** is a student organization that aims to provide middle school and high school students opportunities to learn about engineering and figure out whether it's a good career choice for them. The organization is run by ECE undergraduate and graduate student volunteers.

For more information on graduate student organizations and opportunities for future involvement in the ECE department, please contact [Bari Morchower](#), Student Organizations and Activities Advisor in Pittsburgh, or [Brittany Reyes](#), Academic Services Coordinator and Student Organizations Advisor in Silicon Valley.

## Press & Media Relations

ECE's Communication Manager is the point-of-contact between news media and the ECE, including faculty, students, and staff.

If any student, staff or faculty member of ECE is contacted by a media representative, they are required to immediately inform either the Communication Manager and/or the Director of Operations. Members of the ECE community are not required to answer any questions from the media without first seeking information from ECE's Communication Manager and/or the Director of Operations.

Persons interested in publicizing a program, project, event, or other activity affiliated within ECE should contact the Communications Manager [Krista Burns](#) who can provide guidance on internal and external communications.

## Electrical & Computer Engineering Brand & Logos

The [Information Technology Services \(ITS\) website](#) contains information regarding the department's branding and identity standards.

## PRE-MATRICULATION

### Deferral

ECE generally does not allow admission deferrals because admission decisions are based on the current applicant pool. Therefore, students are offered admission into the program for a particular semester only. If a student wishes to attend in a future semester, the student must reapply to the ECE program.

## Final Undergraduate Transcripts

Applicants admitted to any ECE program must submit final official transcripts, properly sealed, upon completion of their undergraduate program from the institution conferring their degree as a condition of enrollment at Carnegie Mellon. Certificates of graduation and/or degree certificates should also be submitted if provided by the institution. Failure to provide such documents that confirm the completion of undergraduate requirements by the end of the first semester of study at Carnegie Mellon may prevent the Ph.D. degree from being certified.

## Responsible Conduct of Research (RCR) Education

The [Office of Research Integrity and Compliance website](#) describes the university's position on ethical research: "Carnegie Mellon University promotes the responsible conduct of research through high standards of ethics and accountability in planning, conducting and reporting research. The responsible conduct of research is demonstrated through behavior that meets generally accepted standards. These standards are set forth by state and federal regulations, institutional policies, professional codes of conduct and personal convictions."

In support of the university's position, ECE requires **all incoming students** to take the appropriate online training offered by the Collaborative Institutional Training Initiative (CITI). The CITI physical science module package is recommended rather than the module package for engineers, although both are acceptable. The courses are available at [citiprogram.org](http://citiprogram.org). Select Carnegie Mellon University as your participating institution when you create your account.

The course(s) may take a few hours to complete but can be done over a period of time. Upon completion of the course(s), students will need to provide their certificate to the Graduate Affairs Office. Instructions on how to submit this certificate are communicated prior to the beginning of the semester.

## ENROLLMENT AND REGISTRATION

### Overview

After matriculating into ECE, students should create an academic plan and register for courses. Students should actively engage in their process by reviewing degree requirements on the website, connecting with their academic advisor, and conferring with their faculty advisor. Once plans are firm, students can proceed by accessing Student Information Online (SIO).

SIO is an important online tool to use during the registration process, as well as throughout graduate school. Students can access SIO with their Andrew ID at [The Hub](#).

Within SIO, there is a Course Planning module that allows students to view and modify their proposed schedule before registering for courses. Once a schedule is developed, it is the student's responsibility to register for courses using their SIO. Students must be registered for every course that they plan to take for the semester, even if it is not taken for credit (e.g., audited courses).

After the first semester, a student's assigned registration time is determined by the number of completed units and cannot be changed. If a student's tuition balance and/or fees are greater than \$0.00, the student will not be able to register until the balance is cleared.

## Degree Progress and Planning

### Student Responsibility

It is the sole responsibility of the student to manage the academic progression of their program. Students are expected to ensure that they are taking the necessary prerequisites and courses to complete degree requirements on time. Students have the ability to add courses, drop courses, and select units for variable unit courses through SIO. It is the students' responsibility to be aware of all academic deadlines, including the add deadline, the drop deadline, the pass/fail deadline, and the audit deadline. Academic deadline information can be found within [The HUB's Academic Calendar](#).

If a student is not progressing as expected, they are expected to seek advice and counsel from their academic advisor and faculty advisor. If the student is concerned that they may be unable to complete degree requirements, they should contact their academic program advisor and faculty advisor for assistance.

### Degree Timeframe and Residency Requirement

Completion of the Ph.D. degree usually takes about four to six years of study (depending on if the student enters with a B.S. degree or an M.S. degree). At least one calendar year of [full-time graduate study in residence](#) (under 'Ph.D.') is required by CIT. This requirement may be waived for part-time students via a petition to the Department Head and the Associate Dean for Graduate and Faculty Affairs.

The total time allowed to complete the Ph.D. degree requirements is six years following the successful completion of the [Ph.D. Qualifying Examination](#). A minimum of 144 units is required beyond the bachelor's degree. In calculating these 144 units, a student's master's degree from another institution can be factored towards the 144 units. Please see the "[Full-time and Part-time Requirements](#)" portion of this handbook for additional information.

Students are encouraged to register as soon as possible for each semester in order to avoid waitlists and ensure that tuition and stipend support continues smoothly.

Students must be physically present and attend class at the start of the semester. If extenuating circumstances exist that prevent a student from attending class, a student must notify the academic advisor and instructors immediately. Not attending class from the start of the semester will have a detrimental effect on a student's progress in the program. ECE will make an effort to verify all students have arrived to begin their program and will consider a student as "withdrawn from the university" if he or she is not here by the tenth day of class as defined by the [academic calendar](#).

International students must consult with CMU's Office of International Education (OIE) for questions on extension of their visa documents or if they complete their degree

requirements in less than three semesters. Please see details and relevant forms on OIE's website under [Maintaining Legal Status](#).

## **Summer Registration Process & Procedures**

Students are expected to continue their research over the summer or pursue an internship that is relevant to their Ph.D. research. Any deviation from this expectation must be approved by the student's faculty advisor prior to the beginning of the summer semester.

Students who are performing full-time research with their faculty advisor should register themselves for 18990-R Reading and Research for 36 units during the Summer 1/All semester.

International students who are completing an internship in the United States must complete the paperwork for Curricular Practical Training (CPT). For more information about internships and CPT, see the [Internship](#) section outlined in this handbook. Academic and OIE advisors will provide students with information about CPT during the spring semester.

## **Vacations & Time-Off**

Students with graduate assistantships are expected to continue with their research during academic breaks (including summer months) with the exception of official University holidays. Paid time off for personal business or vacations generally is not included as part of a graduate's financial support.

A supported graduate student who wants to take a short break (up to two weeks) must get approval for that break from his/her advisor in writing and, if required by the terms of the student's support package, must make up the work. Supported graduate students wishing to take longer periods of personal time off must do so without financial support and must receive written approval from their faculty advisor at least three weeks prior to the requested time off. International students should pay particular attention to the rules governing their visa in relation to time off. The student's faculty advisor will notify the Department's Business Office of any such arrangements so that an appropriate adjustment in the student's support package can be processed.

University holidays include:

- New Year's Day
- Martin Luther King Day
- Memorial Day
- Independence Day
- Labor Day
- Thanksgiving Day
- Day After Thanksgiving
- Day Before Christmas
- Christmas Day
- Day Before New Year's Day

## Full-time and Part-time Requirements

### *Full-time Requirements*

Full-time students must be enrolled for a minimum of 36 units each semester - fall, spring, and summer.

Moreover, international students must be enrolled in a full course load (minimum 36 units) each semester to maintain their immigration status. Enrollment less than full time may be applicable at certain periods of the Ph.D. program (e.g., self-supporting in the final semester). See your academic advisor for more information.

### *Part-time Requirements*

Occasionally, employment constraints may result in a student being enrolled part-time (less than 36 units per semester) in the Ph.D. program while they continue to work full-time elsewhere. Students planning to enroll in the Ph.D. part-time should discuss their part-time status with their faculty advisors and create a plan that will ensure their timely and comprehensive fulfillment of the Ph.D. program. Part-time students should note that the Ph.D. program is rigorous and that students should think carefully about embarking upon a part-time program while continuing to work full-time.

Part-time students are subject to [CIT's residency requirement](#) (under 'Part-Time Graduate Programs') and requires that student spend at least one academic year (fall and spring) on campus over the course of the Ph.D. program. Any deviation from this requirement must be petitioned for by the student and his advisor prior to his or her enrollment in the Ph.D. program. The petition must be approved by the Department Head and the Associate Dean for Graduate and Faculty Affairs.

Part-time students should be enrolled for less than 36 units each fall and spring semester. Most part-time students take 12 or 24 units per semester.

### **Statute of Limitations**

ECE adheres to [CIT's policy on Ph.D. completion timelines](#). The CIT policy is as follows: "Passing the Ph.D. qualifying examination admits a student to candidacy for the Ph.D. degree for a period of no longer than six calendar years. If, at the end of this six-year period, the Ph.D. has not been awarded, the student must reapply for admission to the graduate program and will be judged competitively with other students applying at the same time." Former ECE students who did not fulfill graduation requirements and would like to return to complete a degree should refer to the [statute of limitations](#) in CIT's graduate student policies for more information.

Under extraordinary circumstances, such as leave of absence, military or public service, family or parental leave, or temporary disability, a school or college may, upon the relevant department's recommendation and with the written approval of the dean, defer the lapse of All But Dissertation status for a period commensurate with the duration of that interruption. Students, who are pursuing the Ph.D. degree as part-time students for all semesters of their program, as approved by their program, may also appeal to their program or department for extension of the time to degree limit.

Requests for extensions to the statute of limitations must be submitted to the Graduate Studies Committee at least one semester prior to the statute of limitations expiration.

Students wishing to obtain an extension due to special circumstances must to submit a formal petition at least one semester prior to his or her defense timeline expiring. The time clock will stop for students who have not taken the qualifying exam prior to the leave of absence.

### **Campus Location Tracking & Reporting Requirements**

Students who are not based in Pittsburgh will be required to report their expected location for the future semester by responding to an online poll disseminated by the Graduate Affairs Office. This information is critical in ensuring that students are billed properly and, if they are traveling to the United States from abroad, receive their visa in a timely fashion. Additionally, some programs regulate on how long a student can be in Pittsburgh over the course of the program.

Any deviations from the location requirements outlined by the program must be approved by the student’s faculty advisor. Additional information regarding funding may also be requested by the Business Office in order to facilitate the students’ deviation from traditional location requirements.

Information on location requirements can be found in the table below:

<b>Program</b>	<b>Location Details</b>
<b>CMU   Portugal Dual Degree Program</b>	CMU   Portugal dual degree students receive funding for a total of two years on the Pittsburgh Campus. Students and their advisors should work together to determine where the student will be physically located each semester. Three years will be spent in Portugal.
<b>Silicon Valley</b>	Students and their faculty advisors should work together to determine where the student will be physically located each semester.

Once students have reported their location to the Graduate Affairs Office, any change in plans should be communicated directly to the Graduate Affairs Office. It is the responsibility of the student and his or her advisor to communicate location information to the Graduate Affairs Office. Late or inaccurate reporting of future locations may limit a student’s ability to travel to the United States and may result in inaccurate financial charges to the student’s account.

### **Obtaining an M.S. on the Way to the Ph.D.**

Many Ph.D. students wish to obtain an M.S. on the way to the Ph.D. in order to demonstrate their academic progress in the program and to have a milestone to show on their curriculum vitae/resume. Ph.D. students have two M.S. options: a course M.S. or a project M.S.

### ***Course M.S.***

The **course M.S.** requires 96 units of coursework, 12 units of which can be research. Of the 96 units, 60 units are restricted (including 12 units of research) and 36 are less-restricted.

### ***Project M.S.***

The **project M.S.** is only open to ECE Ph.D. students. This option also requires 96 units of coursework, 36 units of which can be research in exchange for writing a 40 page or less research paper. This paper will need to be approved by both the student's faculty advisor and a second reader who must be an ECE faculty member. Twelve of the 36 units will be allocated to the restricted 60 units, and 24 of the 36 units will be allocated to the less-restricted units.

Both types of M.S. degrees require the completion of a **Request for an M.S. Degree form**. This form must be completed at least two weeks before the final grades deadline if a student is requesting an MS at the end of a given semester.

### **Change of Degree Program**

Sometimes students begin the Ph.D. program and realize that they do not want to continue as a Ph.D. student. When this occurs, students may have the option of switching to the M.S. program. Switches to the M.S. program should be discussed with the student's advisor prior to filling out **the switch to M.S. form** to formalize the switch.

Please note that this switch must be done prior to or within the first 10 days of classes in the semester in which a student would like to switch to the M.S. program via the switch to M.S. form. After the 10<sup>th</sup> day of class, the switch will not be permitted until the following semester and the student will be expected to continue with Ph.D. research until the end of the semester.

Students who switch to the M.S. program will become financially self-supporting, meaning that they will no longer receive tuition or stipend support from the department. Prior to switching to the M.S. program, international students should consult with OIE.

### **Center for the Neural Basis of Cognition (CNBC) Program**

ECE Ph.D. students interested in the neural basis of cognition can apply to the Center for the Neural Basis of Cognition (CNBC) Graduate Training Program, which allows students to combine neuroscience and engineering in an interdisciplinary training program.

The CNBC program offers a certificate graduate training program in collaboration with ECE and several other affiliated doctoral programs at Carnegie Mellon University and the University of Pittsburgh. The program trains interdisciplinary scientists interested in understanding how cognitive processes arise from neural mechanisms in the brain. Students combine intensive training in their chosen specialty with broad exposure to other disciplines that touch on neural computation and problems of higher brain function.

Students who have been accepted to the ECE Ph.D. program can apply to participate in the CNBC graduate training program. The program requires four core courses in the areas of cellular and molecular neuroscience, systems neuroscience, cognitive neuroscience, and computational neuroscience. The CNBC program also includes several colloquium/seminar series, student-run journal clubs, research ethics training, and a variety of optional elective courses. Students in the CNBC program receive travel support and possible computer equipment support.

The following describes how the CNBC course requirements can be integrated with the ECE Ph.D. course requirements:

### ***For incoming Ph.D. students with a B.S.***

Students entering the ECE Ph.D. program with a B.S. degree will be able to complete the CNBC course requirements entirely within the framework of the ECE course requirements. In other words, these students will be able to complete the CNBC course requirements without taking units above and beyond the 96 units required for an ECE Ph.D.

### ***For incoming Ph.D. students with a M.S.***

Students entering the ECE Ph.D. program with a M.S. degree may petition the GSC for one CNBC course to be counted towards fulfillment of an ECE breadth area and course requirements. One other CNBC course will be allowed to count as an ECE-related course with no GSC petition required. The student will then need to take four more courses: two more to satisfy the CNBC requirements, and two more to satisfy the ECE breadth requirement and the 48 units required for an ECE Ph.D.

All students who are planning to complete the CNBC graduate training program along with an ECE Ph.D. are required to meet with their faculty advisor to discuss their course plans. The course plan must then be discussed with the Graduate Affairs Office.

## **Joint Degree Programs**

Joint degrees are when two departments come together to create one program and award one degree. The College of Engineering has a [joint degree program with the Department of Engineering and Public Policy](#) (under 'Joint Degrees with EPP').

## **Courses Outside of Degree Requirements**

Courses that do not satisfy degree requirements include StuCo courses (98), Physical Education course (69), audited courses, and pass/fail courses. Similar to courses taken for degree requirements, students must register for these other courses, and the units will count towards their course load for the semester. Students should confer with their faculty advisor for approval prior to registration.

## **Double Counting Courses**

ECE follows the [CIT Policy on double counting courses](#). Students are required to notify the Graduate Affairs Office prior to declaring a degree outside of ECE as this may have repercussions for your units and coursework to date.



The same course taken two separate times will not count towards the ECE Ph.D. If a student takes the same course twice, the course with the higher grade will be counted towards the ECE Ph.D. course requirements.

## Retaking Courses

If students do not pass a course, they should take a different course that will fulfill the requirement. Retaking a course is not recommended. Students who wish to retake a prerequisite course in which they did not receive the minimum grade required should first confer with their faculty advisor for approval. Should a student choose to retake a course, only the course with the higher final grade will be counted towards the ECE Ph.D., provided the student receives a "B-" or better.

All grades are recorded on the transcript and factored into the cumulative QPA. Depending on previous education (entering Ph.D. program with or without M.S. degree) approved courses will be factored into the 48 or 96 units that fulfill degree requirements are factored into the required 3.0 graduation QPA.

## Auditing Courses

Auditing a course is being present in a classroom without receiving academic credit or a letter grade. An audited course will appear on a student's transcript. Students are permitted to audit courses in consultation with their faculty advisor. Please note that audited courses cannot count towards the Ph.D. Course or Breadth Area requirements.

A student who wants to audit a course is required to:

1. Register for the course in SIO.
2. Obtain permission from the instructor and ask the instructor to sign the [course audit approval form](#).
3. Submit the form to their academic advisor for approval.
4. If approved, the academic advisor will send the form to the HUB for processing.

Once a course audit approval form is submitted to the HUB, a letter grade ('A'-'R') will not be assigned for the course and the declaration cannot be reversed. You can find the deadline for submitting this form on the [Academic Calendar](#). After the deadline, students will not be able to request the option to audit a course.

The extent of the student's participation must be arranged and approved by the course instructor. Typically, auditors are expected to attend class as though they are regular class members. Those who do not attend the class regularly or prepare themselves for class will receive a blank grade. Otherwise, the student receives the grade 'O', indicating an audit.

The units of audited courses count toward the maximum course load units, but do not count toward the degree requirements. Any student may audit a course. For billing, an audited course is considered the same as the traditional courses under the tuition charges. If a part-time student audits a course, he/she will be charged part-time tuition based on the per-unit tuition rate for the course.

## Pass/No Pass Courses

Students are permitted to take courses pass/no pass in consultation with their faculty advisor. Students interested in taking a course pass/no pass should register for the course, then complete the [Pass/No Pass Approval form](#). The form should be signed by the academic advisor. Courses taken pass/no pass cannot count towards the course or breadth requirements for the ECE Ph.D.

Once a Pass/Fail Audit Approval form is submitted to the HUB, a letter grade ('A'-'R') will not be assigned for the course and the declaration cannot be reversed. Passing work (letter grade 'A'-'C-') is recorded as 'P' (passing grade) on the student's academic record; work with a grade lower than 'D+' will not receive credit and will be recorded as 'N' (not passing grade) on the student's academic record. No quality points will be assigned to 'P' or 'N' grades; the units of 'P' or 'N' grades will not be factored into the student's QPA.

The units of pass/no pass courses count toward the maximum course load units, but do not count toward the degree requirements. You can find the deadline for submitting this form on the [Academic Calendar](#). After the deadline, students will not be able to request the option to pass/fail a course.

Any student may take a course pass/fail. For billing, the pass/fail course is considered the same as the traditional courses under the tuition charges. If a part-time student takes a course pass/fail, he/she will be charged part-time tuition based on the per-unit tuition rate for the course.

## Petition Process

Petitions are approved by the GSC. Petitions to the GSC may include program transfers, breadth area substitutions, Ph.D. milestone extensions, increase in units, course substitutions and any other changes that are outside of the policies stated in the student handbook. Students are advised to discuss their petitions with their academic advisors.

The petitions process is as follows:

1. Student completes the appropriate [petition form](#) and submits it to their academic advisor in the Graduate Affairs Office no later than 5pm ET on the Friday before the GSC meeting.
2. The academic advisor presents the petition to the GSC.
3. Students are notified of the outcome of their petition via an email from the Ph.D. Academic Advisor after the GSC has met. Generally, all GSC decisions are final.
  - a. Due to time constraints, some petitions may be tabled until the following GSC meeting. When this occurs, students will be notified via email.
4. The academic advisor saves a finalized version of the petition in the student's academic file.

## Transfer Course Petition Process

Up to 12-units of course taken at another university, whether taken before or after entering the ECE graduate program, may be transferred in and counted towards the ECE Ph.D., provided that the course:

- Fulfills an ECE degree course requirement and is equivalent to an ECE course
- Is considered a graduate level course at the university where it was taken (unless requesting transfer credit for the one allowed undergraduate course)
- Has not been used to fulfill requirements for any previously earned degree

Please note that this policy is more restrictive than the [CIT transfer credit policy](#) (under 'Transfer Credit and Special Students'). A grade of 'B' or better must be earned for the course to be transferred. The transfer credits will appear on the student's transcript and will not be factored into the QPA.

Transfer credit is not granted prior to admission and must be approved by the Graduate Studies Committee and CIT Dean's Office. Courses can only be requested for transfer after the student has successfully completed 36 units of coursework at Carnegie Mellon. After matriculating to Carnegie Mellon, ECE students should consult with their academic advisor before taking a course at another university.

Transfer courses will be reviewed for academic rigor and alignment with courses offered in ECE. The course description and syllabus, learning outcomes, delivery mode, and institutional accreditation will be considered when evaluating the course for transfer.

If a course has previously counted towards a degree, you may still request that the course count towards the Breadth Area requirement.

The process for petitioning to transfer a course is as follows:

1. Meet with academic advisor and faculty advisor to discuss the course transfer
2. Complete and collect the following mandatory documents:
  - a. [Petition for Graduate Studies Committee approval](#)
  - b. Official transcript from previous institution
  - c. Detailed course description/syllabus (should include grading scale, assignments required, mandatory books, and time required in class) of the course you wish to transfer in
  - d. Letter from the previous institution's registrar or academic advisor stating the course intended for transfer was not used towards a degree
  - e. E-mail endorsement from the instructor of the ECE course you believe your transfer course is most equivalent to
  - f. [Graduate Transfer Credit Request form](#)
3. Submit the completed packet to the academic advisor
4. The academic advisor will present the transfer request to the CIT Dean's office and notify the student of the result. Once the petition is approved, the Graduate Affairs Office will work with the student to complete the transfer request.

## **Pittsburgh Council on Higher Education (PCHE) Cross-Registration Program**

Full-time Carnegie Mellon students may take subjects for credit through the Pittsburgh Council on Higher Education (PCHE). The purpose is to provide opportunities for enriched educational programs by permitting *full-time* paying undergraduate and graduate students to cross-register for **one** course at any of the ten PCHE institutions. Please refer to [The HUB website](#) for additional details.

## Registering for Courses

### Academic Calendar

ECE adheres to the official CMU [Academic Calendar](#). The [Heinz College](#) and the [Tepper School](#) follow their own calendars with dates that may differ from the University's calendar for the add, drop and pass/fail/audit deadlines. ECE students must adhere to the deadlines of the courses they are taking if the courses are in Heinz or Tepper.

### Course Load

Prior to registering each semester, it is strongly recommended that students consult with their faculty advisor in order to ensure that their course load is balanced and relevant to the student's Ph.D. research.

Some programs have specific registration requirements. These requirements are outlined in the table below.

Program	Registration Details
CMU   Portugal Dual Degree Program	CMU   Portugal dual degree students should register for at least 36 units each semester whether they are in Portugal or Pittsburgh.
Silicon Valley	Silicon Valley students should register for at least 36 units each semester whether they are in Silicon Valley or Pittsburgh.

### Adding Courses

Students have the option of adding courses to their schedule starting at their assigned registration time until the add/drop deadline through SIO. If a student wishes to be added to a course after the add/drop deadline, the [Course Add Request Form](#) must be completed and signed by the course instructor. Then, the student must submit the form to their academic advisor for approval. If approved, the academic advisor will send the form to the HUB for processing.

In the event that an ECE course (18-XXX) is cross-listed with a course from another department, ECE students must register for the ECE course number.

Courses in the Tepper School of Business may be taken and can be registered for through a site outside the SIO. Tepper will publish a list of available MBA courses, and in order to register for Tepper courses, students should visit the [Tepper registration site](#).

### Course Locations

Courses will take place at various buildings and room locations across CMU campuses as assigned by the University Registrar's office each academic semester. Each course location is tied to a section and has a final assignment that is linked to the final grade. It could be in the form of a final exam, final project, or research as stated in the syllabus on the first day of classes. Students should register for sections of their courses according to their physical campus location. Please refer to the schedule of classes available on your campus.

## Dropping Courses

Students have the option of dropping courses from their schedule starting at their assigned registration time until the add/drop deadline through SIO. When a course is dropped before the drop deadline, it does not appear on the transcript. As a courtesy to others, students should drop a course as soon as they decide not to take it. This will allow a waitlisted student to be enrolled and will limit the disruption to any team-based projects.

## Withdrawing from Courses

Students should remove themselves from a course before the **drop deadline** each semester. If a student chooses to withdraw from a course after the drop deadline, the student must officially withdraw from the course and should consult with their academic advisor and faculty advisor to discuss the withdrawal. Withdrawals take place after the drop deadline but before the last day of the semester. Students must complete and submit the **Course Withdrawal Request form** with their academic advisor in order to withdraw from a course. More information on withdrawal grades can be found on the CMU policy website under the **grading policy**. Withdrawals receive a “W” grade for the course on a transcript; this “W” grade is not factored into the QPA but the course does count towards the maximum units.

## Waitlists

It is typical to be waitlisted from the time of registration up until the tenth day of class. This is common practice across the university to ensure that students within the department have the opportunity to take the courses they need in order to graduate. To determine the likelihood that you will be registered from a waitlist for an ECE course, students in Pittsburgh should send an e-mail to [coursehub@ece.cmu.edu](mailto:coursehub@ece.cmu.edu); students in Silicon Valley should email Brittany Reyes at [bjreyes@andrew.cmu.edu](mailto:bjreyes@andrew.cmu.edu). You should only attend courses for which you are waitlisted if you have permission from the instructor. Students may only be waitlisted for a maximum of 5 courses.

As a courtesy, students should remove themselves from the waitlist and/or drop a course in a timely fashion so as to allow other students the opportunity to be removed from the waitlist and enrolled in a course.

Students should check their schedules frequently on SIO as they may be enrolled from a waitlist without being notified. In addition, during the registration process, the Registrar’s Office will require students to “tag up” on their waitlists in order to confirm the desire to remain on the waitlist for a course. Failure to confirm their waitlists will result in being dropped from the waitlist.

It is strongly recommended that students have a back-up plan in case they are not removed from a waitlist by the tenth day of class.

## Technology Enhanced Courses

The ECE department offers courses that are taught exclusively online, and some have a live recitation component. ECE refers to them as “Technology Enhanced” courses and can be identified by the section code that includes “T”. Other departments with online

courses may list their technology enhanced courses in a different format, so be sure to check with the instructor if it is unclear whether a course is online. International students on a US residential campus (Pittsburgh, Silicon Valley) may take a maximum of one online course per semester that does not have a required in-person component, per F1 regulations.

## Courses with Time Conflicts

Students are not permitted to register for two courses that conflict in time. Registration may be possible with consent from an instructor, allowing the conflict or attendance at an alternate time. Students should forward permissions from instructors to their academic advisor in order to register for conflicting courses.

## Prerequisites

While SIO may allow you to register for courses without the published prerequisite, it is the student's responsibility to have adequate background knowledge to be successful in the subsequent course. This background knowledge may come in the form of an introductory course taken at Carnegie Mellon, your undergraduate institution, or other work/research experience. We recommend that you consult with the instructor as it is at the discretion of the instructor to decide if a prerequisite course or knowledge can be waived.

For ECE courses that require 18-600/15-213/15-513/18-213 as a prerequisite, students will not be permitted to enroll in the subsequent course without credit for 18-600/15-513. 18-600 and 15-513 are the only courses available to graduate students that satisfy the prerequisite requirement. Students attending Pittsburgh campus can plan to take 15-513 in the summer prior to their matriculation in the fall semester. Tuition will apply at a **per unit rate**.

Graduate courses that require 18-600/15-213/15-513/18-213 anywhere in their prerequisite tree include:

- 18-640 - Foundations of Computer Architecture
- 18-648 - Embedded Real-Time Systems
- 18-649 - Distributed Embedded Systems
- 18-656 - Data Intensive Workflow Development for Software Engineers
- 18-725 - Advanced Digital Integrated Circuit Design
- 18-740 - Computer Architecture
- 18-742 - Parallel Computer Architecture
- 18-745 - Rapid Prototyping of Computer Systems
- 18-746 - Advanced Storage Systems
- 18-748 - Wireless Sensor Networks
- 18-756 - Packet Switching and Computer Networks
- 18-759 - Wireless Networks
- 18-842 - Distributed Systems
- 18-845 - Internet Services
- 18-848 - Special Topics in Embedded Systems

## Final Exams

All ECE students must attend final exams as scheduled by the university and individual course instructors. If a student believes that a final exam presents a scheduling conflict, he or she must discuss the issue with the course instructor. The ECE administration does not have control over the university exam schedule. Please keep this in mind when arranging travel at the end of a semester; having purchased airline tickets is not a proper excuse for missing a final exam. Please refer to [Carnegie Mellon University Policies on Examinations](#) for additional information.

## Enrollment Verifications

[The Hub](#) is the primary contact for students or alumni who would like to request a transcript, enrollment verification, or other information related to their time in ECE.

ECE may verify some limited information in the form of a letter, which may be suitable for some purposes, such as the verification of skills students acquired through the ECE programs. Please contact your academic advisor for more information. ECE may verify some limited information in the form of a letter, which may be suitable for some purposes, such as the verification of skills students acquired through the ECE programs. Please note that the ECE department is only able to verify information on ECE and Computer Science courses. Information on courses offered in other departments can only be verified by the other department. To obtain a verification, the student or alumni should contact the Graduate Affairs Office.

## Leave of Absence

Occasionally, students must pause their degree program due to personal, professional, or academic reasons. A student who is considering a leave of absence should speak to his or her academic advisor prior to taking a leave of absence in order to ensure his or her understanding of the leave of absence policy and its ramifications.

Leaves of absence are capped at two calendar years' total throughout the Ph.D. program. In extreme cases, a student may request additional leave time via a petition to the GSC. If they do not return within two academic years, they will be administratively withdrawn from the graduate program. Students are not eligible to complete departmental milestones while on a leave of absence and must return from a leave of absence in order to complete any program requirements, including the Course requirement, Breadth Area requirement, Teaching Internships (TI), Qualifying Exam, Prospectus, and thesis or dissertation defense.

Anyone who is intending to return to the program outside of the two-year leave must re-apply to the graduate program. Questions can be addressed to the Ph.D. Academic Program Advisor.

Once a student decides to take a leave of absence, he or she should complete the [Leave of Absence form](#) and bring it to their academic advisor for additional processing. Please note that the student's advisor must sign the leave of absence form. Please note that the student's advisor must sign the leave of absence form. The student and his or her faculty advisor are expected to have a conversation about the requirements for the student's return. ECE faculty are not required to hold spaces in their research group

for students who are on leaves of absences. As a result, a student may need to be prepared to find a new faculty advisor and new funding in order to return from a leave.

### **Returning from a Leave of Absence**

To return from a leave of absence, the student must have financial support and an ECE faculty advisor's approval. A student's return must coincide with the start of a new semester (fall, spring, or summer). Students cannot return from a leave of absence in mid-semester, with the exception of summers.

A student intending to return from leave must submit the [Petition to Return from Leave of Absence form](#) to their academic advisor at least 30 days prior to the start of the semester in which he/she plans to return. A student's return must coincide with the start of a new semester (fall, spring, or summer). Students cannot return from a leave of absence in mid-semester, with the exception of summers.

Per [university policy on student leaves](#), "Students on leave are not permitted to live in university housing, attend classes or maintain employment as students at Carnegie Mellon while their leave is in effect."

### **Degree Certification Process & Commencement**

Ph.D. degrees will be certified once they have completed their dissertation, defense, and all required paperwork pertaining to publication permissions and contact information. In addition, students must have provided a final copy of their undergraduate transcript(s) and must have a tuition balance of \$0.00 to receive a diploma. Students will be notified of their degree certification via email once the certification has been completed by the Graduate Affairs Office.

Before graduation, students should update their contact information, such as mailing address and e-mail address, within SIO. Also, students should review a proxy of their diploma in SIO to verify the information displayed there, such as the spelling of their name.

Students who are certified in the summer or fall semesters will be invited to attend the next commencement ceremony. Spring graduates will be invited to the spring commencement ceremony. Students are not eligible to participate in the Doctoral Hooding Ceremony or the ECE Diploma Ceremony unless their degree has been certified by the Graduate Affairs Office.

The title of the degree students receive is *Doctor of Philosophy in Electrical and Computer Engineering*.

## **ACADEMIC STANDARDS**

### **Grades**

Below are the policies surrounding grades for students in the Department of Electrical and Computer Engineering.



## University Policy on Grades

The [university policy on grading](#) offers details concerning university grading principles for students taking courses and covers the specifics of assigning and changing grades, grading options, drop/withdrawals and course repeats. It also defines the undergraduate and graduate grading standards.

## CIT Grading Policy

ECE follows the [CIT letter grade scale](#). The [letter grade scale](#) is 'A' (highest for CIT students), 'A-', 'B+', 'B', 'B-', 'C+', 'C', 'C-', 'D+', 'D', and 'R' (lowest). CIT students cannot receive an 'A+' grade on their transcript, even if a course is taken from another college where 'A+' is given. Grades lower than 'C', meaning C- or below, are considered [failure in CIT](#) and will not count toward degree requirements.

## Incomplete Grade

Incomplete grades will be assigned at the discretion of the course instructor, per the [university grading policy](#).

## Withdrawal Grade/Withdrawing from Courses

Students can withdraw from a course after the add/drop deadline until the last day of classes. This will result in a 'W' on the transcript, which is not factored into the QPA. To withdraw, the [course withdrawal request form](#) must be completed and submitted to the academic advisor for approval. If approved, the academic advisor will send the form to the HUB for processing. Students should confer with their faculty advisors before withdrawing from a course.

## Academic Performance

### Quality Point Average

In order to graduate, each student must have a Quality Point Average (QPA) of at least 3.0 in the courses being used towards the required units for the Ph.D program. Coursework or graduate project units with a grade lower than 'C' will not be considered toward graduate degree requirements; however, they will be calculated into the student's cumulative QPA.

### Satisfactory Progress & Program Dismissal

Students are expected to make satisfactory academic progress each semester of the Ph.D. program. "Satisfactory" progress may be defined differently for each student. Students should work together with their faculty advisor to determine what satisfactory progress entails and to improve performance when a student receives feedback that progress has been unsatisfactory.

Occasionally, students fail to meet their advisor's expectations for satisfactory progress for several semesters, despite ongoing attempts to rectify any issues. When this situation occurs, faculty may issue a dismissal letter to students. Such letters must be issued no later than the end of the first week of the semester in which a dismissal is taking place (for example, dismissal letters for the Fall 2016 semester must be sent to

students by the Department by the end of the first week of classes in the Fall 2016 semester). This timing is in order to give students adequate time to make other arrangements in order to continue in the Ph.D. program.

Dismissal letters are drafted by the student's faculty advisor, and then sent to the Department Head and Graduate Affairs Office for review and approval. Once the letter has been approved, the letter will be distributed to the student via email. The letter will outline the causes for dismissal and possible options for the student. Students who receive dismissal letters should schedule an appointment to meet with the Graduate Affairs Office to discuss their options. International students should also schedule an appointment with OIE to discuss the potential visa ramifications of a program dismissal.

Faculty may rescind a dismissal letter in writing and must notify the Department Head and Graduate Affairs Office of any such action. Dismissal from a program will result in the loss of the student's affiliation with CMU and their student status.

## Academic Integrity

Students at Carnegie Mellon are engaged in preparation for professional activity of the highest standards. Each profession constrains its members with both ethical responsibilities and disciplinary limits. To assure the validity of the learning experience a university establishes clear standards for student work.

In any presentation, creative, artistic, or research, it is the ethical responsibility of each student to identify the conceptual sources of the work submitted. Failure to do so is dishonest and is the basis for a charge of cheating or plagiarism, which is subject to disciplinary action.

ECE adheres to Carnegie Mellon's [policy on academic integrity](#) and all students are expected to review the policies prior to their arrival at CMU. ECE also adheres to [CIT's policy](#) on graduate student academic integrity violations.

## Penalties for Violating Academic Integrity

Instructors are responsible for defining academic integrity for students in their courses, including student performance expectations and attendance requirements. Students are responsible for understanding and abiding by the instructor's academic integrity policies. Policies may vary from instructor to instructor and students should seek further guidance from a faculty member if they have specific questions about a course's academic integrity policy.

Should an instructor believe that an academic integrity violation has occurred, he or she may consult with the Office of the Dean of Student Affairs, who will assist the faculty member in handling a possible academic integrity violation and, if a student is found responsible for violating academic integrity policies, determining possible sanctions. In accordance with the university's policy, a student who violates the academic integrity policy will not be permitted to drop the course in which the offense occurred in order to avoid penalty. If the student attempts to drop the course, he/she will be reenrolled.

If a student is found to have violated the academic integrity policy for a second time,

the student will be dropped from the Department of Electrical and Computer Engineering effective at the end of the semester in which the infraction has occurred. Students have the right to [appeal an academic integrity decision](#).

## PH.D. DEGREE REQUIREMENTS

### Overview

The Ph.D. degree requires that multiple milestones be completed before a degree is certified. These milestones are addressed in greater detail in the following section but include:

- [Coursework](#)
- [Breadth Area Requirements](#)
- [Qualifying Exam](#)
- [Research](#)
- [Teaching Internships](#)
- [Prospectus](#)
- [Thesis](#)
- [Defense](#)

Below is an example of a student’s plan of study over the duration of the Ph.D. program. Please note that this plan is an example and may vary based on whether the student has an MS degree prior to enrolling, on conversations between the student and his or her advisor and which program the student is enrolled in.

	Semester									
Milestones	F1	S1	F2	S2	F3	S3	F4	S4	F5	S5
Research	X	X	X	X	X	X	X	X	X	X
Courses & Breadth	2 classes	2 classes	2 classes	2 classes						
Qualifying Exam				X students incoming F15	X students enrolled prior to F15					
Teaching Internship			X			X				
Prospectus								X		
Thesis and Defense										X

### Coursework

Prior to registering each semester, it is strongly recommended that students consult with their faculty advisor in order to ensure that their course load is balanced and relevant to the student’s Ph.D. research.

Students in the Ph.D. program without a M.S. degree and students in the Ph.D. program who have an ECE M.S. degree from Carnegie Mellon must take a total of eight ECE or related courses (96 units) at Carnegie Mellon. At least six of these eight courses must be graduate courses.

Students in the Ph.D. program who have earned a M.S. degree elsewhere (outside of CMU's ECE Department) must take a total of four ECE or related courses (48 units) at Carnegie Mellon. At least three of these four courses must be graduate courses. Students who received an M.S. in ECE from CMU may use their M.S. courses to count towards the Ph.D. requirements. Students who have received an M.S. from CMU in ECE are strongly encouraged to schedule an appointment with the Ph.D. Academic Program Advisor to discuss their M.S. courses and which will count towards the Ph.D. degree requirement.

Courses taken at Carnegie Mellon to satisfy the M.S. degree course requirements may count toward the Ph.D. course requirements.

A comprehensive list of graduate courses that have been approved for the ECE Ph.D. can be found on the [Ph.D. Breadth Area website](#). In addition to this list, any 12-unit ECE course at the 18-600 level or higher, with the exception of any project, seminar and independent study courses, is approved to count towards the ECE Ph.D. degree. Courses in the Computer Science Department (CSD) that are 15-700 or higher and are non-project, non-seminar or non-independent study courses are also approved.

Twelve (12) units of professional development coursework in ECE may be counted towards the ECE Ph.D. requirement through the following options (please note that that these courses do not have a Breadth Area assignment):

- One of the following 12 unit courses in ECE: 18-601, 18-603, 18-605, 18-606, 18-700, 18-703 or 15-894;
- 3 unit internship (18-994), repeatable up to 3 times, for a total of 9 units;

And/Or

- One or both of the following 6 unit "Technical Writing for Engineers" courses: 18-701 and 18-702

Undergraduate courses that are pre-approved to count towards the ECE Ph.D. include ECE undergraduate courses 300 or above (18-3XX) and CSD courses 300 or above (15-3XX).

Students must receive a "B-" grade or better in both the graduate and undergraduate courses in order for the course to count towards the Ph.D. requirements.

### **Course Restrictions**

Courses where more than 50% of the course grade is based on a group project or more than 20% is based on attendance cannot be used towards the required units. Mini courses worth 12 units cannot be used towards the required units. Students are responsible for checking the syllabi for classes to ensure their courses meet these requirements.

## Petitioning to Count a Course Not on the Pre-approved List

Students wishing to count a graduate course at Carnegie Mellon not listed in the approved graduate course list, or an undergraduate course offered by another department at Carnegie Mellon, must formally petition the Graduate Studies Committee. Please see the section in this handbook on [petitions](#) and schedule an appointment with your academic advisor for more information.

## Breadth Area Requirement

The ECE Department has defined eight technical areas as Breadth Areas for the Ph.D. degree. These areas are:

- Algorithms/Complexity/Programming Languages
- Applied Physics (Solid State/Magnetics/Fields)
- Artificial Intelligence, Robotics and Control
- Circuits
- Computer Hardware Engineering
- Signal Processing and Communications
- Software Systems and Computer Networking
- Other (by petition)

Each Ph.D. candidate must take at least one graduate class from three of these areas to fulfill the breadth requirement. Students must receive a "B-" grade or better in these courses.

Students may be able to count one course that they have taken during a previous degree toward the breadth course requirement, but must submit a formal petition for approval by the Graduate Studies Committee. If the petition is accepted, only two more breadth areas must be satisfied. However, students will still be held to the same course requirements.

## Qualifying Exam Requirement

Students who are working towards a Ph.D. degree are required to take the Ph.D. Qualifying Examination. The Ph.D. Qualifying Examination tests the student's ability to think, speak and write. Students have to read and understand three technical papers that define the examination topical area. Students then write a review paper as well as orally present this review to a faculty examining committee. This committee includes three faculty from the ECE department whose research focus is in the area the student wants to be tested on. The student has to answer detailed questions from the faculty committee. These questions can be about the review paper and presentation, the reference papers, and obvious undergraduate-level technical background for the material in the review and reference papers.

## Timeline

Students matriculating in the Fall 2015 semester or afterwards must take the Ph.D. Qualifying Exam for the first time no later than the fourth semester after being admitted to the Ph.D. program, and must pass the exam no later than the fifth semester

after being admitted to the Ph.D. program. Summer semesters are not included in this qualifying exam timetable.

Students matriculating prior to Fall 2015 must take the Ph.D. Qualifying Exam for the first time no later than the fifth semester after being admitted to the Ph.D. program, and must pass the exam no later than the sixth semester after being admitted to the Ph.D. program. Summer semesters are not included in this qualifying exam timetable. Students are encouraged to take the Ph.D. qualifying exam as soon as possible.

Each student should determine with her or his advisor when to take the qualifying exam the first time.

The time clock determining when a student must take the qualifying exam is stopped for one semester if the student is engaged in a full-time industrial internship during an academic year semester (fall or spring). This policy applies for only one semester of internship. Students engaged in internships for more than one academic year semester may submit a petition to request a deferment of the qualifying exam timeline beyond one semester; although there is no guarantee that this petition will be approved.

Fall exams generally occur in the middle of November. Spring exams generally occur in the middle of April.

## **Mechanics**

- *Declaration, Abstract, and Technical Papers (due in September or February)*

With faculty advisor input, the student will complete a qualifying exam declaration, write a presentation abstract, and submit three technical papers. The declaration will allow students to rank order between seven [7] and ten [10] ECE faculty that the student and his or her advisor feel would be the best fit for the examination committee. The three technical papers provide context to the faculty examining committee regarding the student's area of focus.

Students can choose no more than two papers that may have authors who are currently faculty at Carnegie Mellon. Students can choose no more than one paper that the student has co-authored. The total length of all three papers may not exceed 50 pages.

The Graduate Studies Committee reviews the declaration packets, and recommends a three-faculty examining committee. While every attempt is made to choose faculty from the students' initial list of seven faculty on the declaration, these preferences cannot always be accommodated due to faculty availability and committee balancing. This committee is subject to approval by the student's faculty advisor.

- *Review paper (due in October or March)*

The Qualifying Examination tests your written communication skills through a short review paper. This paper defines the focus of your Qualifying Examination topic. You should explain your technical area, your work and the relationship

between your work and the content of the student's three technical papers. This paper must not exceed four pages and must be in a 2-column format.

- *Exam (occurs in November or April)*

Prior to the start of the qualifying exam, the Graduate Affairs Office will communicate the exam's date, time, committee, and location to the qualifying exam student via email.

The Qualifying Examination tests a student's oral communication skills by having the student present a short, conference-style talk during the first 30 minutes of a Qualifying Exam. The examining faculty will typically ask the student's questions to help clarify the presentation immediately following your presentation.

Once the clarification question and answers are completed, the examining committee will ask the student questions about the student's research area, technical papers, review paper, and electrical and computer engineering fundamentals that relate to your research area.

## **Outcomes**

Upon the conclusion of the qualifying exam, the faculty examiners will consult with each other and grade the qualifying exam. All qualifying exams will be discussed at the faculty Qualifying Exam review, which occurs on the Friday of the second week of qualifying exams. The final outcome will be determined by the faculty at this meeting.

All students will be notified of their qualifying exam outcome and provided with feedback after the faculty has convened.

Students failing the qualifying exam the first time can take it a second time, no later than the sixth semester after being admitted to the Ph.D. program if the student started prior to Fall 2015 or the fifth semester if the student started in the Fall 2015 semester or afterwards. One faculty member from the first exam committee will serve on the second committee. A student who fails the exam twice must leave the Ph.D. program at the end of the semester in which the second failure occurs.

Students who pass the qualifying exam will officially be recognized as candidates for the Ph.D. degree.

## **Research**

All full-time Ph.D. students are required to complete research every semester they are enrolled in the program. The completion of research is represented by the student's enrollment in *18990 Reading and Research* each semester. Expectations for research and productivity vary greatly throughout the department and should be discussed regularly with the student's faculty advisor(s).

Each fall and spring semester, students should register for *18990 Reading and Research* in the section that represents their physical location.

18990 Reading & Research sections:

- Section A: For students studying in Pittsburgh
- Section PP: For all CMU Portugal students who will be in Portugal. (CMU Portugal students in Pittsburgh will register for section A.)
- Section SV: For all Silicon Valley students who will be in Silicon Valley. (SV students in Pittsburgh will register for section A.)

Resources and Regulations Governing Research at Carnegie Mellon that may be of interest to Ph.D. students include the following:

- [Office of Sponsored programs](#)
- [Office of Research Integrity & Compliance](#)
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Students are expected to abide by the university’s position on ethical research as posted on [The Office of Research Integrity and Compliance website](#). See the section in this handbook on “Responsible Conduct of Research Education” for more information.

### Teaching Internship Requirements

All ECE Ph.D. students are required to complete two teaching internships (“TI”) over the course of the Ph.D. program. These teaching internships are unpaid and students will receive a letter grade reflecting their performance as a TI. Students must receive a “B” or better in the TI course in order to receive credit for completing the teaching internship.

The TI program is coordinated through the Academic Services Office. All students must complete a [teaching assistant preference form](#) in order for the TI to be formally recognized by the department. The Academic Services Office will work with the student to enroll him or her in the correct course representing their work as a TI prior to the start of the semester.

Students may complete a TI for a course outside of ECE or during the summer semester, but it must be approved by the Associate Department Head for Academic Affairs and recorded by the Associate Director of Student and Academic Affairs prior to the student starting the TI. Students should contact the Graduate Affairs office to facilitate this process.

Programs that are not based in Pittsburgh may have requirements pertaining to where each Teaching Internship is completed. More information on location-specific requirements can be found below:

Program	Teaching Requirements
CMU   Portugal Dual Degree Program	CMU   Portugal dual degree students will complete one TI in Pittsburgh and one TI in Portugal.
Silicon Valley	Silicon Valley students will complete one TI in Pittsburgh and one TI Silicon Valley.



Expectations for students completing a teaching internship or teaching assistantship can be found at <https://www.ece.cmu.edu/insider/grads/ta-overview.pdf>. Students are expected to support the course instructor and establish mutual expectations while providing excellent academic support to students. Depending on a student's area of expertise and English proficiency, he or she may be assigned to a variety of tasks that can range from grading to leading recitations.

Graduate students are required to have a certain level of fluency in English before they can instruct in Pennsylvania, as required by the [English Fluency in Higher Education Act of 1990](#).

### *Evaluation and Certification of English Fluency for Instructors*

Graduate students are required to have a certain level of fluency in English before they can instruct in Pennsylvania, as required by the [English Fluency in Higher Education Act of 1990](#). For more information about requirements, see the "Evaluation & Certification of English Fluency for Instructors" section in the University Policies of this handbook.

### **Prospectus**

All Ph.D. students are required to prepare a thesis prospectus (also known as a proposal) within four semesters following the successful completion of the Ph.D. Qualifying Examination. This time clock begins with the semester following the Qualifying Examination. A calendar year has three semesters (spring, summer and fall). If a student leaves for a semester to return to industry, this four-semester clock is stopped. However, the time clock for the overall Ph.D. program is not stopped. The Ph.D. prospectus clock stops when the student leaves and begins the semester the student returns. Students who have not met their Ph.D. prospectus requirement within the four-semester time limit must discuss a revised timeline with their advisor prior to the semester Graduate Progress Review.

The prospectus is both an informal written description of the problem to be investigated and the expected accomplishments of that investigation, and an oral presentation to the Prospectus Committee for its review and recommendations. Both the prospectus requirements must be completed at least one semester prior to the final defense.

### **Prospectus Format**

The Ph.D. prospectus write up should be no more than 25 double-spaced pages in length, although prospectuses that are on the order of five to ten pages are encouraged. The prospectus should include the following:

- An explanation of the basic idea of the dissertation topic;
- An explanation as to why this topic is interesting;
- A statement as to what kind of results are expected, and;
- A convincing argument as to why these results are attainable in a reasonable amount of time

Furthermore, the prospectus should not be:

- A summary or abstract of the dissertation;

- The first chapter or part of the dissertation;
- A technical report;
- A survey of the field, or;
- An annotated bibliography

Students should discuss the presentation format of their prospectus with their faculty advisor. Typically, a student is expected to provide a 45-60 minute presentation on his/her prospectus, and then participate in a question-and-answer-based discussion with his/her committee.

## **Prospectus Committee**

The Prospectus Committee consists of at least four members, including the student's faculty advisor. At least two members of this committee must be ECE faculty and at least one member must be from outside the department. Faculty members from other departments who hold courtesy appointments in ECE are considered to be inside the department. Faculty members who hold an adjunct appointment are considered to be outside members. All committee members must hold a doctoral degree.

All four committee members must actively participate in both the prospectus meeting and defense and at least three committee members must be physically present. It is desirable to have all committee members participate in person; however, a student is allowed to have one committee member of four participate by teleconferencing. Any deviation from this teleconferencing policy is exceptional and additional information must be provided on the Prospectus form. Because of the nature of the ICTI dual-degree program, teleconferencing requests by ICTI students will be approved by default.

It is expected that any committee members participating remotely will have full audio and visual access to the presentation via teleconferencing equipment. It is the responsibility of the student to provide teleconferencing access to committee members participating remotely. Students can email [help@ece.cmu.edu](mailto:help@ece.cmu.edu) for assistance in setting up teleconferencing equipment.

## **Prospectus Procedure**

Once the date, time and place of the prospectus have been confirmed, the student should email the completed [Ph.D. Prospectus Declaration form](#) to the Graduate Affairs Office at least one week before the presentation. An electronic copy of the proposal paper should be submitted to the Ph.D. Academic Program Advisor on or after the presentation date.

Students will be notified by the Graduate Affairs Office of the approval of their committee. Once the committee has been approved, the student will meet with his or her committee to present the prospectus to them. In order to encourage open and frank dialogue, this presentation is attended only by the student, the committee and any other interested ECE faculty members. Other attendees must be approved by the committee chair.

The outcome of this meeting will be either that the prospectus is accepted or not accepted. If the prospectus is not accepted, the student will be asked to revise it and

meet again with the committee for approval. If the prospectus is accepted, then students should continue to move forward with his or her thesis.

## Milestone Review

Upon completion of the prospectus proposal, students should make an appointment to meet with the Ph.D. Academic Program Advisor to review the fulfillment of Course and Breadth Area requirements, as well as Teaching Internship (TI) requirements. Provided that the student has satisfied the aforementioned program milestones, he/she may be informed of their eligibility for All But Dissertation (ABD) status.

## All But Dissertation Status

Once a student has completed all program requirements, with the exception of the thesis and defense, the student is required to go on All But Dissertation (ABD) status. Two ABD options are available to students:

- ABD in Residence (ABD): students continue enrolling for 36 units each semester and will continue to receive stipend support.
- ABD in Absentia (ABS): students stop enrolling at CMU and no longer receive tuition or stipend support. The student will be responsible for paying the technology fee each semester he/she is ABS. When the student is ready to come back and defend, he/she will notify the Graduate Affairs Office, which will work with the student to re-enroll him or her in ECE. The student will be responsible for registering for and paying for 5 units of *18990 Reading and Research* as well as all fees. Please note that international students may face additional constraints before going ABS and should consult with the Graduate Affairs Office to obtain more information.

The full university [Policy for Doctoral Status](#) is a series of policies that set forth a definition of All But Dissertation (ABD), time limits on doctoral candidacy status, a definition of *in residence* and *in absentia* status for ABD candidates and the tuition charged for candidates in each status.

The ABD status agreement form and ABD status change form can be found on The HUB's [Forms & Guides website](#) under the 'Student Records' section.

## Ph.D. Dissertation

Once the Ph.D. thesis is written, the student must submit the [Defense Declaration form](#) to the Graduate Affairs Office at least two weeks before the student's defense date. The Thesis Committee is usually the same as the Prospectus Committee. If there is any change in the committee, the student must submit a biographical description of any new committee member from outside Carnegie Mellon for approval. Additionally, students are expected to adhere to Carnegie Institute of Technology (CIT) guidelines on providing defense committees with a copy of the thesis prior to the defense. CIT recommends that students provide their committee with a copy of the thesis at least 1.5 months prior to the defense.

The oral defense is a public examination open to all members of the Carnegie Mellon community. All the members of the student's Prospectus Committee must actively

participate in the defense meeting. It is desirable to have all committee members participate in person; however, a student is allowed to have one committee member participate remotely by teleconferencing. Any deviation from this teleconferencing policy must be requested via the Defense Declaration Form. Due to the nature of the ICTI dual-degree program, teleconferencing requests by ICTI students will be approved by default.

It is expected that any committee members participating remotely will have full audio and visual access to the presentation via teleconferencing equipment. It is the responsibility of the student to provide teleconferencing access to committee members participating remotely. Students can email [help@ece.cmu.edu](mailto:help@ece.cmu.edu) for assistance in setting up teleconferencing equipment.

In addition to these ECE requirements, CIT has its own requirements pertaining to the [thesis and defense process](#). This site includes instructions for the document standards and format. Students should pay particular attention to the format of the thesis title page and the required content of the acknowledgements section.

Per CIT requirements, all defenses should be complete at least two weeks prior to the final grade deadline of a given semester. Doing so should grant students sufficient time to make necessary revisions and complete all post-defense paperwork prior to the end of the semester. Any deviation from this timeline is discouraged and may hinder a student's ability to graduate on time. Such deviation from the cited timeline may be subject to additional departmental approval and should be discussed with the Graduate Affairs Office well in advance of the planned defense.

Please note: Students who **do not** successfully complete the dissertation, defense, and all defense-related paperwork prior to the final grades deadline of a given semester may be required to register for the following semester and receive tuition and stipend support.

After the defense, the Graduate Affairs Office will review additional paperwork that will need to be completed prior to a student's degree certification with the student.

## Departmental Progress Reviews

All students working towards a Ph.D. degree must regularly demonstrate progress towards meeting the ECE Ph.D. requirements by completing a Graduate Progress Review Statement each fall and spring semester.

In this statement, the student must describe his or her:

- Activities as a graduate student researcher;
- Research goals and achievements;
- Activities as a member of the ECE community;
- Courses taken since enrollment as a graduate student in ECE, and;
- Plans for the following semester

These statements are typically due during the first week of November (fall semester) and April (spring semester). Students are encouraged to discuss the completed statement with their advisor.

Students who have passed the qualifying exam will also be asked to create a single-slide summary of his or her progress towards the ECE Ph.D. degree.

The Graduate Progress Review Statement and slide summary inform faculty discussions during each semester's Graduate Progress Review meeting. The outcome of this review is a grade that characterizes the student's progress towards the Ph.D.: satisfactory ("S") and unsatisfactory or not passing ("N"). Students who receive an "N" grade for the first time must meet with their advisor and define a course of action to achieve a satisfactory grade in the next semester. Students who continue to make inadequate progress towards the ECE Ph.D. may be subject to dismissal.

Ph.D. students do not receive a letter grade for their research each semester with one exception: students will receive a letter grade in their final semester as a graduate student in the ECE Department or prior to receiving an MS degree on the way to the Ph.D.

All students who have passed the qualifying exam will receive a letter from their faculty advisor each semester summarizing their progress and offering suggestions for improvement or continued success. This letter is typically distributed by the final grade deadline of the fall or spring semester.

### **Internships Course Option**

ECE students may wish to participate in paid internships at off-campus organizations during the summer months.

ECE will enroll all students who are pursuing an internship for a 3-unit credit bearing internship course (18-996, 18-997, & 19-998) Internship for Electrical and Computer Engineering Graduate Students), which can each be taken once each throughout the student's ECE Ph.D. degree program of study. This internship will appear on a student's transcript. Ph.D. students typically are not charged summer tuition, including the Internship course. However, in the event that a student takes another summer class, summer tuition may be assessed for the summer internship course as well. Please contact your academic advisor and see details for CIT cost of attendance [here](#). The work for the internship must be appropriate to the goals of the academic program and units can be applied toward the Ph.D. Course Requirement.

Eligible international students who are interested in pursuing off-campus internships must meet with departmental and OIE representatives. For additional information, please refer to OIE's website on [Employment Options](#) for international students. Academic and OIE advisors will provide students with information about CPT during the spring semester.

## **POST-MATRICULATION GUIDELINES**

### **Return of University Property**

ECE students must return all borrowed ECE and university materials—such as software, manuals, library books/materials, or any other Carnegie Mellon University property—prior to their departure from the program.

## Career Services Employment Outcomes

ECE students are asked to complete and return a survey for Career Services updating CMU on their employment outcomes after graduation. Information about the survey is communicated in the students' final semester.

### “Grandfather” Clause

When policies are changed, it is because the department believes the new rules offer an improvement; any such changes will be communicated to students. In case degree requirements are changed and certain courses are no longer offered, the department will try to find some compromise that allows those students to satisfy the original requirements.

## TUITION, FEES, FINANCES, AND FINANCIAL SUPPORT

### Purchasing & Reimbursements

At ECE, most purchasing actions, including airline tickets, are conducted by administrative departmental employees rather than a central purchasing authority. Buyers are encouraged to purchase goods and services from the administrative coordinators and not use their own funds. If you use your own funds and they charge tax, you will not be reimbursed for the tax applied to the purchase. All purchases including travel which are done on CMU's behalf need to have the direct approval of the faculty member or PI of the project.

The preferred method of making travel arrangements is through one of the university's preferred travel agencies with which the administrative coordinator can provide assistance. By purchasing the tickets through these agencies, the cost of the tickets is charged directly to the university instead of the student or employee paying the cost personally and needing to be reimbursed. The administrative coordinators also will complete a reimbursement for any items or travel accrued.

Please keep in mind that you must provide transaction-supporting documentation in accordance with Carnegie Mellon requirements and government policies on reimbursements. Expense reports must be submitted within 90 days after completing the travel or incurring the expense, otherwise, the reimbursement will be treated as taxable income to the individual. Please see the administrative coordinator to arrange for travel and purchasing, as well as reimbursements.

All purchases of goods, services, and equipment using University funds by charging directly to an account string, including restricted accounts and research grants and contracts, should be made at the direction of a CMU faculty or staff member. Only certain department staff members are able to confirm an order with an outside vendor. Please plan ahead. Rush orders for pick-up or delivery and orders of over \$1,000 are difficult to accommodate.

Basic office supplies are purchased by the Administrative Coordinators for general use by ECE students, faculty, and staff. Teaching Assistants should speak to an Academic Services Assistant for research- and teaching-related supplies.

Questions should be directed to the [ECE Finance Office](#), located in HH 1116. Please visit [CMU's Procurement Services website](#) for more information.

## Graduate Student Reimbursement Policy

### Business Expenses

As an educational institution, CMU is exempt from Pennsylvania state sales tax. Whenever possible, business purchases should be made by your faculty advisor's Administrative Coordinator or by another faculty or staff member with a tax-exempt purchasing card.

If it is necessary to make a purchase using personal funds, legitimate business expenses can be reimbursed by the department. Your faculty advisor's Administrative Coordinator will help you claim reimbursement provided you have the following:

- Receipt indicating item purchased and proof of payment
- Business purpose for purchasing item
- Account to be charged for reimbursement
- Faculty or staff approval

Please consult with the appropriate Administrative Coordinator prior to incurring the expense for additional instruction. Software purchases in particular should only be made after consulting with a departmental staff member, as the purchase will often require approval from the University Contracts office due to the popularity of Click-Through Agreements ("CTA"). If personal funds are used to make a business purchase requiring a CTA without prior approval from Contracts, it is possible that the expense in question will not be reimbursable.

### Travel Expenses

If agreed on in advance with your advisor or with another departmental staff member, legitimate travel expenses can be reimbursed by the department. Your advisor's Administrative Coordinator will help you claim reimbursement once you provide the following:

- Hotel receipts must show a zero balance with proof of payment and your name
- Receipts for meals must be collected, unless you claim per diem meals; both daily meals and per diem meals cannot be claimed for the same travel expense report. Current per diem rates can be verified on [the GSA website](#).
- Personal car mileage for business purposes; standard mileage reimbursement rates for gas/fuel but not tolls
- Business purpose for travel
- A program or agenda, when available
- Account to be charged for reimbursement
- Approval by an ECE faculty or staff member

### Conditions

Tax will be reimbursed for expenses incurred due to normal business related travel (hotel, airfare, meals) but **not** for miscellaneous expenses, such as the purchase of a

replacement mouse for a department laptop, poster board for a presentation, etc., purchased while traveling or preparing for travel. These items should have been purchased through a department approved buyer thus not incurring tax expense.

## Academic Year Tuition & Stipend

Research assistantships are provided by research projects which are funded by government agencies, private industries, and consortia. Students who are research assistants will be expected to conduct appropriate research under the direction and guidance of their faculty advisor(s). Tuition and stipend support is renewable based on a student's acceptable performance in course work and research and the faculty advisor's funding availability.

In most situations, as long as the student is in good academic standing (with regard to grade average, progress in the program, and length of time in the program), full tuition remission will be given.

For the academic year 2017-2018, this tuition is valued at approximately \$43,000. Students are responsible for the costs of purchasing their own books and miscellaneous supplies. A listing of estimated **cost of attendance** is provided for student use, with tuition increasing approximately 3% per academic year to account for inflation.

Unless noted otherwise, stipend payments will be disbursed twice a month (semi-monthly) following the academic year cycle (August 16<sup>th</sup> through August 15<sup>th</sup> each year). Payment occurs once in the middle of the month and once on the last working weekday of the month. Exact pay dates are available on the [CMUWorks Payroll Resources website](#) (see Graduate Student - Semi-Monthly - Pay Date).

The stipend amount for all Ph.D. students, with the exception of Silicon Valley students, is equal to \$2,781 per month for the 2017-2018 academic year. The stipend for Silicon Valley Ph.D. students is equal to \$2,982 per month for the 2017-2018 academic year to allow for the increased cost of living in the Silicon Valley area. Silicon Valley Ph.D. students can apply for up to \$1,000 of travel reimbursement from the ECE Department for the Qualifying Exam. More details about the reimbursement procedure will be communicated upon the submission of the Qualifying Exam Declaration.

Stipend amounts are reviewed each year and augmented according to increases in cost of living. Such increases will be communicated to students in the spring semester prior to the following academic year.

## Summer Semester Tuition & Stipend

Students supported by the ECE department are expected to continue working over the summer in some capacity, either via research on campus or through an off-campus internship. Students will continue to be compensated at the same stipend rate paid during the academic year if they are working on campus. Stipend payments will be suspended if the student is doing an off-campus internship or has failed to register for the summer semester.

Tuition is not assessed during the summer semester if the student is registered for *18990 Reading and Research*. Registration for other courses may trigger a tuition charge for



which the student will be responsible to pay unless prior arrangements have been made with the student's faculty advisor. It is the student's responsibility to understand the financial repercussions of his or her summer registration.

## Losing, Reducing, or Changing Funding

If a student is supported by the department through an external grant or contract, and this funding is lost, reduced, or changed, the advisor will notify the student accordingly. All efforts will be made to facilitate the student's continuation in his/her degree program, if he or she is progressing satisfactorily in the program. Students who are not progressing satisfactorily may receive a dismissal letter. The dismissal process is outlined in the "Satisfactory Progress and Program Dismissal" of this handbook. More information about becoming self-supporting is contained in the following section.

## Self-Supporting Students

With few exceptions, almost all Ph.D. students in the ECE department are funded through the department or a third party entity. Students are typically not allowed to self-support. One exception to this requirement is that, occasionally, students who are in All But Dissertation (ABD) status must become self-supporting due to a change in an advisor's funding situation and/or because of other factors.

Per CIT's [In Residence Status for ABD Candidates policy](#) (under 'All But Dissertation Status):

"Under exceptional circumstances, ABD students who are self-supported, and who can demonstrate financial hardship, may petition the College through the departments for permission to register for 5 units of thesis research per semester." The exceptional circumstances for such approval include:

- Self-supporting with demonstrated financial hardship
- At least three years of full time student status
- Good standing and progress towards a degree
- No more than two semesters of required work; ABD with In Residence status and 5 units of tuition per term will not be allowed for more than two semesters of work, where a summer is considered to be one semester."

Students should fill the [self-supporting template](#) in with his or her information and then sign the petition and obtain his or her advisor(s) signatures as well. The student should then send the petition to the Graduate Affairs Office for further processing prior to the 10<sup>th</sup> day of class in the semester in which they are becoming self-supporting.

If the student has not completed the degree program after two self-supporting semesters, and no additional funding from the faculty advisor is available, the student will have the option of going ABD in absentia, taking a leave of absence, or withdrawing from the ECE Ph.D. program.

## Fees

ECE will pay for each student's technology fee as long as the student is enrolled as a full-time student or is under All But Dissertation in Residence (ABD) status. If a student goes on ABD in absentia (ABS), the student will be responsible for paying for the

technology fee each semester he or she is in absentia as well as the semester in which the student returns to defend. When a student returns from ABD in absentia to defend, he or she will be responsible for paying for all fees and tuition assessed.

Students are responsible for paying the Student Activities Fee, the PAT Transit Fee, and for health insurance. Students are encouraged to check their SIO regularly to ensure that all outstanding balances are addressed. Many students pay for their Carnegie Mellon health insurance and other charges directly from their stipend through the [Tuition Management System](#).

The technology fee and tuition are paid over eighteen monthly installments (August 16<sup>th</sup> -May 15<sup>th</sup>). The process decreases the student account balance incrementally over the academic year such that the tuition balance reaches zero in the middle of May.

## Taxes

The deadline for local, state, and federal taxes is April 15. You can obtain tax forms in the mail, at the post office, or at the Carnegie Library. Questions about your tax status should be addressed to the IRSTeleTax at 412-261-1040, or the Pennsylvania Department of Revenue at 412-565-7540. Although subject to federal taxes, student stipends are generally not assessed local or state taxes.

## Conference & Travel Funding

As a department, ECE does not provide centralized travel or conference funding. However, students are encouraged to talk to their faculty advisor(s) about travel or conference funding. The Office of the Assistant Vice Provost for Graduate Education does provide some conference funding via an application process. Conference funding is provided by GSA and the Provost's Office for students, student work groups, or groups to attend a conference, whether as a participant or as a presenter. Students can find more information about the application process and deadlines at [www.cmu.edu/graduate](http://www.cmu.edu/graduate).

## Additional Sources for Financial Support

### University Financial Aid

Graduate students should consult the graduate student financial aid information found on [the HUB's Student Financial Aid website](#). Students will find the Graduate Financial Aid Guide, information about funding options and how to apply for financial aid and other helpful links.

### Emergency Loans

The Office of the Dean of Student Affairs offers short-term emergency loans for supplies, medication, food or other unexpected circumstances. The loans are interest-free and for short periods of time (not longer than a month). Graduate students who find themselves in need of immediate funds for emergency situations should contact the [Office of the Dean of Student Affairs](#) to inquire about an Emergency Student Loan (see Appendix A).

## Fellowships

Students who are interested in applying for external fellowships should see their advisor or check the online information provided by the [Office of Scholarships and Fellowships website](#). The website is an excellent resource for locating an abundance of information regarding available funding for students.

Additionally, fellowship opportunities will be announced periodically over the course of the academic year by the department. While students can apply directly to some of these fellowships, most require an internal competition to identify top students for nomination. Students are encouraged to monitor the [ECE Fellowship Opportunities website](#) for active fellowships.

## GuSH Funding

[GuSH Research Funding](#) is a source of small research grant funds provided by GSA and the Provost's Office and managed by the Office of the Assistant Vice Provost for Graduate Education.

## Teaching Assistantships

Once an ECE Ph.D. student has completed the two required Teaching Internships (TIs), he or she can continue to teaching assistant for courses for hourly pay instead of receiving academic credit. Students must fill out the [teaching assistant preference form](#) in order to formally be matched to a course.

Graduate students are required to have a certain level of fluency in English before they can instruct in Pennsylvania, as required by the [English Fluency in Higher Education Act of 1990](#). For more information about requirements, see [Evaluation & Certification of English Fluency for Instructors](#) in the University Policies of this handbook.

## Payroll

Other questions concerning payment options should be addressed to the [ECE Finance Office](#) in HH 1116.

## Outside Employment

ECE follows [CIT guidelines on outside employment](#) (under 'Graduate Student Consulting'). Full-time students in ECE are expected to devote their full-time to research, teaching, and coursework per the compensation students are receiving via the stipend during the academic year.

Occasionally, there are employment opportunities offered to students that will enrich their research, coursework, and teaching. In these situations, students should consult with their faculty advisor regarding the opportunity and how it may impact their academic progress. Prior to accepting a position, students must receive written permission from both the faculty advisor and Department Head. Full-time students will be expected to keep up with their full-time research commitments even while employed outside of CMU. Students may consider taking a leave of absence to pursue full-time employment; however, this should be discussed with the student's advisor(s) and the Graduate Affairs Office prior to the student deciding to take a leave.

Please note that international students have additional constraints on their eligibility to pursue employment outside of CMU. OIE provides [additional information](#) on maintaining legal employment status on their website. International students are responsible for ensuring that their work authorization is valid and up to date.

## CAREER SERVICES

The [Career and Professional Development Services Center](#) (CPDC) serves to provide students with guidance during their job and internship searches. The services available to students include resume reviews, mock interviewing, salary negotiation, career exploration consultation, internship and job consultation, workshops/events and employer relations. The CPDC is also heavily involved in organizing campus-wide job fairs and bringing employers to campus.

Handshake is Carnegie Mellon's online recruiting system. Through Handshake, employers can request accounts to post jobs, request interviews and information sessions, and review student resumes. Students and alumni can apply to positions, sign up for interviews and find contact information for thousands of recruiters. Handshake can be accessed through the CPDC website.

### Career Consultants

ECE has assigned career consultants who provide guidance through one-on-one appointments. Students in Pittsburgh can meet with career consultants [Marcie Foy](#) and [Shaina Tsupros](#), while students in Silicon Valley can meet with Director of Career Services [Lauren Schachar](#). Appointments with Marcie, Shaina, or Lauren can be made through Handshake. They will each also hold open office hours, which will be communicated at the beginning of each semester.

### Job Search Guidelines

ECE strives to play a supportive role in the career pursuits of students, but maintains academics as a priority. It is not acceptable for students to skip classes or assignments in order to attend job interviews. Students should conduct job searches in a manner that does not impede the academic progress through their graduate program.

It is also important for students to have an understanding of how to conduct a job search. When applying for jobs, students are expected to exhibit certain ethical behavior, such as arriving on time for interviews, being truthful about their qualifications, and to honor their agreements with recruiters. Further, students should not continue looking and interviewing for a position after they have accepted an offer.

The CPDC reserves the right to limit access for any users that do not follow [job search guidelines](#). Students who do not follow such guidelines may forfeit their on-campus interviewing and/or resume submission privileges.

## UNIVERSITY POLICIES

### Academic Integrity

Students at Carnegie Mellon are engaged in intellectual activity consistent with the highest standards of the academy. The relationship between students and instructors

and their shared commitment to overarching standards of respect, honor and transparency determine the integrity of our community of scholars. The actions of our students, faculty and staff are a representation of our university community and of the professional and personal communities that we lead. Therefore, a deep and abiding commitment to academic integrity is fundamental to a Carnegie Mellon education. For more information on these standards, please visit the link below: <http://www.cmu.edu/policies/student-and-student-life/academic-integrity.html>

### **Assistance for Individuals with Disabilities**

Students with disabilities are encouraged to self-identify with [Office of Disability Resources](#) by contacting [Catherine Getchell](#), 412-268-6121, to access the services available at the University. For more information, please visit the link below: <http://www.cmu.edu/education-office/disability-resources/>

### **Evaluation & Certification of English Fluency for Instructors**

Graduate students are required to have a certain level of fluency in English before they can instruct in Pennsylvania, as required by the [English Fluency in Higher Education Act of 1990](#). Teaching Assistant English Fluency is managed through the International Teaching Assistant testing process administered by CMU's Intercultural Communication Center. For details please visit the links below:

<http://www.cmu.edu/policies/faculty/evaluation-certification-english-fluency-instructors.html>

<http://www.cmu.edu/icc/>

### **Leave of Absence & Withdrawal Policies**

“Leave of absence” means leaving the university temporarily, with the firm and stated intention to return. “Withdrawal” means leaving the university with no intention to return. Withdrawals or leaves taken on or before the university deadline to drop classes without receiving a ‘W’ (withdrawal) grade will result in all courses or grades being removed. Withdrawals or leaves taken after the university deadline to drop classes but before the last day of classes will result in ‘W’ grades assigned to all classes. Withdrawals or leaves taken after the last day of classes will result in permanent grades assigned by the instructors for each class. After the last day of class, courses cannot be removed from a student’s transcript.

International students should consult with the Office of International Education (OIE) prior to taking a leave of absence or withdraw from their program.

Further information about Carnegie Mellon’s policy on student leave is available at the following link: <http://www.cmu.edu/policies/student-and-student-life/student-leave.html>

Students who would like to take a leave of absence or withdraw must complete the appropriate form at the following link: <http://www.cmu.edu/hub/forms.html>

Please see “Preparing an Academic Plan” section (under Administrative and Program Policies) of this handbook for ECE’s policy on leave of absence and withdrawals.

## Tuition Refund Policy

If an ECE student withdraws or takes a leave of absence, the HUB will determine if a student should receive a tuition refund, as this is governed by [CMU's policies](#), not ECE's. Additional information is available at the following link:

<http://www.cmu.edu/hub/tuition/adjustment.html>

## Returning to Carnegie Mellon

When a student plans to return to CMU after a leave of absence, he/she must complete the [Petition for Return from Leave of Absence form](#) at least one month prior to the start of the semester. We recommend doing so prior to the registration period for the upcoming semester (for Fall, April and for Spring, November). The student must also meet any conditions that were set by ECE or the university at the time of leave was granted. Further information about Carnegie Mellon's policy on student return is available at the following link: <https://www.cmu.edu/hub/registration/leave.html>

## Suspension/Required Withdrawal Policy

University suspension is a forced, temporary leave from the university. A student may be suspended for academic, disciplinary, or administrative reasons. Additional information is available at the following link: <http://www.cmu.edu/policies/student-and-student-life/suspension-required-withdrawal-policy.html>

## Withdrawal of a Degree

The university reserves the right to withdraw a degree even though it has been granted should there be discovery granted that the work which it was based on the academic records in support of it had been falsified. The complete reference to this university policy is available at: <http://www.cmu.edu/policies/student-and-student-life/withdrawal-of-a-degree.html>

## University Grievances

Students are encouraged to discuss any concerns or grievances informally within ECE. If a student is not satisfied with the results of informal discussion or formal appeal at the department level, he or she may follow the [guidelines](#) on Graduate Student Appeal and Grievance Procedures. Students are likewise encouraged to speak directly to their graduate student's representatives and to the president of the Graduate Student Assembly (GSA). The complete reference to this policy is available at: <http://www.cmu.edu/graduate/policies/appeal-grievance-procedures.html>

## Student Maternity Accommodation Protocol

Female students seeking Maternity Accommodations should visit the following link from the Graduate Education's website: <http://www.cmu.edu/graduate/programs-services/maternity-accommodation-protocol.html>

## Verification of Employment

Carnegie Mellon University employees or former employees are required to use [Employee/Former Employee Request Form for Verification of Employment](#) to request

employment verification. Vendors, such as mortgage companies, may continue to use standard formats with a signed authorization. Please contact the CMUWorks Service Center at [cmu-works@andrew.cmu.edu](mailto:cmu-works@andrew.cmu.edu) with questions.

## APPENDIX A: ADDITIONAL UNIVERSITY RESOURCES

Highlighted University Resources for Graduate Students and The WORD Student Catalog

### Key Offices for Graduate Student Support

#### Office of the Assistant Vice Provost for Graduate Education

[www.cmu.edu/graduate](http://www.cmu.edu/graduate); [grad-ed@cmu.edu](mailto:grad-ed@cmu.edu)

The Office of the Assistant Vice Provost for Graduate Education, AVPGE, directed by Suzie Laurich-McIntyre, Ph.D., Assistant Vice Provost for Graduate Education, provides central support for graduate students in a number of roles. These include: being an ombudsperson and resource person for graduate students as an informal advisor; resolving formal and informal graduate student appeals; informing and assisting in forming policy and procedures relevant to graduate students; and working with departments on issues related to graduate students and implementation of programs in support of graduate student development.

The Office of the AVPGE often partners with the division of Student Affairs to assist graduate students with their Carnegie Mellon experience. Senior members of the student affairs staff are assigned to each college (college liaisons) and are often consulted by the Assistant Vice Provost for Graduate Education and departments on an individual basis to respond to graduate student needs.

The Office of the Assistant Vice Provost for Graduate Education (AVPGE) offers a robust schedule of professional development opportunities. Some are geared towards a specific population (master's students, PhD students at the beginning of their program, graduate students seeking tenure track positions, etc.) and others are open to all graduate students (time management, balancing, staying healthy). A full schedule of programs can be found at: <http://www.cmu.edu/graduate>.

The Office of the AVPGE also coordinates several funding programs, and academically focused seminars and workshops that advise, empower and help retain all graduate students, particularly graduate students of color and women in the science and technical fields. The fundamental goals of our programs have been constant: first, to support, advise and guide individual graduate students as they work to complete their degrees; second, to contribute to the greatest degree possible to the diversification of the academy. Visit the Graduate Education website for information about:

- Conference Funding Grants
- Graduate Small Project Help (GuSH) Research Funding
- Graduate Student Professional Development: seminars, workshops and resources
- Graduate Women Gatherings (GWG)
- Inter-university Graduate Students of Color Series (SOC)

#### Office of the Dean of Student Affairs

[www.cmu.edu/student-affairs/index.html](http://www.cmu.edu/student-affairs/index.html)



The Office of the Dean provides central leadership of the metacurricular experience at Carnegie Mellon. The offices that fall under the division of Student Affairs led by Dean of Student Affairs Gina Casalegno, include:

#### Career and Professional Development Center

- Counseling & Psychological Services (CAPS)
- Housing & Dining Services
- Orientation & First Year Programs (note: for undergraduate students)
- Office of International Education (OIE)
- Student Activities
- Student Life

Graduate students will find the enrollment information for Domestic Partner Registration and Maternity Accommodations in the Office of the Dean of Student Affairs and on the website. The Office of the Dean of Student Affairs also manages the Emergency Student Loan (ESLs) process. The Emergency Student Loan service is made available through the generous gifts of alumni and friends of the university. The Emergency Student Loan is an interest-free, emergency-based loan repayable within 30 days. Loans are available to enrolled students for academic supplies, medication, food or other expenses not able to be met due to unforeseeable circumstances. The Office of the Dean of Student Affairs also provides consultation, support, resources and follow-up on questions and issues of Academic Integrity: [www.cmu.edu/academic-integrity](http://www.cmu.edu/academic-integrity).

#### Silicon Valley Student Services

Students on the Silicon Valley campus can meet with the Director of Student Affairs, Sari Smith, for on-site connection to various student services resources. These resources include questions regarding housing, transportation, health, personal concerns, student organizations, activities and general campus information. Sari Smith's office is located in B19 Room 1041, and can be reached by phone at 650-335-2846 or email at [sari.smith@sv.cmu.edu](mailto:sari.smith@sv.cmu.edu). The CMU-SV Student Services Webpage has more information about student services in Silicon Valley: <http://www.cmu.edu/silicon-valley/campus-life/index.html>

#### Eberly Center for Teaching Excellence & Educational Innovation

[www.cmu.edu/teaching](http://www.cmu.edu/teaching)

Support for graduate students who are or will be teaching is provided in many departments and centrally by the Eberly Center for Teaching Excellence & Educational Innovation. The Eberly Center offers activities for current and prospective teaching assistants as well as any graduate students who wish to prepare for the teaching component of an academic career. The Center also assists departments in creating and conducting programs to meet the specific needs of students in their programs. Specific information about Eberly Center support for graduate students can be found at:

<http://www.cmu.edu/teaching/graduatestudentsupport/index.html>

#### Carnegie Mellon Ethics Hotline

The health, safety and well-being of the university community are top priorities at Carnegie Mellon University. CMU provides a hotline that all members of the university community should use to confidentially report suspected unethical activity relating to financial matters, academic and student life, human relations, health and campus safety or research.

Students, faculty and staff can anonymously file a report by calling 877-700-7050 or visiting [www.reportit.net](http://www.reportit.net) (user name: tartans; password: plaid). All submissions will be reported to appropriate university personnel.

The hotline is NOT an emergency service. For emergencies, call University Police at 412-268-2323.

## **Graduate Student Assembly**

[www.cmu.edu/stugov/gsa/index.html](http://www.cmu.edu/stugov/gsa/index.html)

The Carnegie Mellon Student Government consists of an Executive Branch and a Legislative Branch. This is the core of traditional student government, as governed by the Student Body Constitution. The Executive Branch serves the entire student body, graduate and undergraduate, and consists of one president and four vice-presidents. The Legislative Branch for graduate students, The Graduate Student Assembly (GSA) passes legislation, allocates student activities funding, advocates for legislative action in locally and in Washington D.C. on behalf of graduate student issues and needs, and otherwise acts on behalf of all graduate student interests. GSA also contributes a significant amount of funding for conferences and research, available to graduate students through application processes. GSA also plans various social opportunities for graduate students and maintains a website of graduate student resources on and off-campus, [www.cmu.edu/stugov/gsa/resources/index.html](http://www.cmu.edu/stugov/gsa/resources/index.html). Each department has representation on GSA and receives funding directly from GSA's use of the student activities fee for departmental activities for graduate students. The department rep(s) is the main avenue of graduate student representation of and information back to the graduate students in the department.

## **Intercultural Communication Center (ICC)**

[www.cmu.edu/icc/](http://www.cmu.edu/icc/)

The Intercultural Communication Center (ICC) is a support service offering both credit and non-credit classes, workshops, and individual appointments designed to equip nonnative English speakers (international students as well as international students who attended high school in the U.S.) with the skills needed to succeed in academic programs at Carnegie Mellon. In addition to developing academic literacy skills such as speaking, reading and writing, students can learn more about the culture and customs of the U.S. classroom. The ICC also helps international teaching assistants (ITAs) who are non-native English speakers develop fluency and cultural understanding to teach successfully at Carnegie Mellon and provides ITA testing, required testing indicating a nonnative speaking student has a language proficiency required before being allowed to work with undergraduates in classes, labs or individual meetings.

## Office of International Education (OIE)

[www.studentaffairs.cmu.edu/oie/](http://www.studentaffairs.cmu.edu/oie/)

Carnegie Mellon hosts international graduate and undergraduate students who come from more than 90 countries. Office of International Education (OIE) is the liaison to the University for all non-immigrant students and scholars. OIE provides many services including: advising on personal, immigration, academic, social and acculturation issues; presenting programs of interest such as international career workshops, tax workshops, and cross-cultural and immigration workshops; supporting international and cultural student groups such as the International Student Union and the International Spouses and Partners Organization; maintaining a resource library that includes information on cultural adjustment, international education and statistics on international students in the United States; posting pertinent information to students through email and the OIE website, and conducting orientation programs.

## Key Offices for Academic & Research Support

### Computing and Information Resources

[www.cmu.edu/computing](http://www.cmu.edu/computing)

Computing Services provides a comprehensive computing environment at Carnegie Mellon. Graduate students should seek Computing Services for information and assistance with your Andrew account, network access, computing off-campus, campus licensed software, email, calendar, mobile devices, computer security, cluster services and printing. Computing Services can be reached at [it-help@cmu.edu](mailto:it-help@cmu.edu).

The Carnegie Mellon Computing Policy establishes guidelines and expectations for the use of computing, telephone and information resources on campus. The policy is supported by a number of guidelines graduate students should know. The policy and guidelines are available at: [www.cmu.edu/computing/guideline/index.html](http://www.cmu.edu/computing/guideline/index.html).

### Research at CMU

<http://www.ece.cmu.edu/research/index.html>

The primary purpose of research at the university is the advancement of knowledge in all fields in which the university is active. Research is regarded as one of the university's major contributions to society and as an essential element in education, particularly at the graduate level and in faculty development. Research activities are governed by several university policies. Guidance and more general information is found by visiting the Research at Carnegie Mellon website.

### Office of Research Integrity & Compliance

<http://www.cmu.edu/research-compliance/>

The Office of Research Integrity & Compliance (ORIC) is designed to support research at Carnegie Mellon University. The staff work with researchers to ensure research is conducted with integrity and in accordance with federal and Pennsylvania regulation. ORIC assists researchers with human subject research, conflicts of interest, responsible conduct of research, export controls, **intellectual property** rights and regulations, and

institutional animal care & use. ORIC also consults on, advises about and handles allegations of research misconduct.

## **Key Offices for Health, Wellness & Safety**

### **Counseling & Psychological Services**

[www.studentaffairs.cmu.edu/counseling](http://www.studentaffairs.cmu.edu/counseling)

Counseling & Psychological Services (CAPS) affords the opportunity for students to talk privately about issues that are significant for them in a safe, confidential setting. Students sometimes feel confused about why they are feeling upset and perhaps confused about how to deal with it. An initial consultation with a CAPS therapist will clarify options and provide a recommendation to the appropriate mental health resource at Carnegie Mellon or the larger Pittsburgh community. CAPS services are provided at no cost. Appointments can be made in person or by telephone, 412-268-2922.

### **Health Services**

[www.cmu.edu/HealthServices/](http://www.cmu.edu/HealthServices/)

University Health Services (UHS) is staffed by physicians, advanced practice clinicians and registered nurses who provide general medical care, allergy injections, first aid, gynecological care and contraception as well as on-site pharmaceuticals. The CMU student insurance plan covers most visit fees to see the physicians and advanced practice clinicians & nurse visits. Fees for prescription medications, laboratory tests, diagnostic procedures and referral to the emergency room or specialists are the student's responsibility and students should review the UHS website and their insurance plan for detailed information about fees. UHS also has a registered dietician and health promotion specialists on staff to assist students in addressing nutrition, drug and alcohol and other healthy lifestyle issues. In addition to providing direct health care, UHS administers the Student Health Insurance Program. The Student Health Insurance plan offers a high level of coverage in a wide network of health care providers and hospitals. Graduate students should contact UHS to discuss options for health insurance for spouses, domestic partners and dependents. Appointments can be made by visiting UHS's website or by telephone, 412-268-2157.

### **University Police**

<http://www.cmu.edu/police/>

412-268-2323 (emergency only), 412-268-6232 (non-emergency)

The University Police Department is located at 300 South Craig Street, Room 199 (entrance is on Filmore Street). The department's services include police patrols and call response, criminal investigations, shuttle and escort services, fixed officer and foot officer patrols, event security, and crime prevention and education programming. Visit the department's website for additional information about the staff, escort and shuttle, emergency phone locations, crime prevention, lost and found, finger print services, and annual statistic reports.

## Shuttle and Escort Services

University Police coordinates the Shuttle Service and Escort Service provided for CMU students, faculty, and community. Full information about these services, stops, routes, tracking and schedules can be found online at: <http://www.cmu.edu/police/shuttleandescort/>.

Carnegie Mellon University publishes an annual campus security and fire safety report describing the university's security, alcohol and drug, sexual assault, and fire safety policies and containing statistics about the number and type of crimes committed on the campus and the number and cause of fires in campus residence facilities during the preceding three years. Graduate students can obtain a copy by contacting the University Police Department at 412-268-6232. The annual security and fire safety report is also available online at [www.cmu.edu/police/annualreports](http://www.cmu.edu/police/annualreports).

## The WORD

<http://www.cmu.edu/student-affairs/theword//>

The WORD is Carnegie Mellon University's student on-line catalog and is considered a supplement to the department (and sometimes college) catalog. The WORD contains campus resources and opportunities, academic policy information and resources, community standards information and resources. It is designed to provide all students with the tools, guidance, and insights to help you achieve your full potential as a member of the Carnegie Mellon community. Information about the following is included in The WORD (not an exhaustive list) and graduate students are encouraged to bookmark this site and refer to it often. University policies can also be found in full text at: <http://www.cmu.edu/policies/>.

Carnegie Mellon Vision, Mission

Carnegie Code

Academic Standards, Policies and Procedures

- Educational Goals

- Academic and Individual Freedom

- Statement on Academic Integrity

- Standards for Academic & Creative Life

  - Assistance for Individuals with Disabilities

  - Master's Student Statute of Limitations

  - Conduct of Classes

  - Copyright Policy

  - Cross-college & University Registration

  - Doctoral Student Status Policy

  - Evaluation & Certification of English Fluency for Instructors

  - Final Exams for Graduate Courses

  - Grading Policies

  - Intellectual Property Policy

  - Privacy Rights of Students

  - Research

    - Human Subjects in Research

Office of Research Integrity & Compliance  
Office of Sponsored Programs  
Policy for Handling Alleged Misconduct of Research  
Policy on Restricted Research  
Student's Rights  
Tax Status of Graduate Student Awards

#### Campus Resources & Opportunities

Alumni Relations  
Assistance for Individuals with Disabilities  
Athletics, Physical Fitness & Recreation  
Carnegie Mellon ID Cards and Services  
Cohon University Center  
Copying, Printing & Mailing  
Division of Student Affairs  
Domestic Partner Registration  
Emergency Student Loan Program  
Gender Programs & Resources  
Health Services  
Dining Services  
The HUB Student Services Center  
ID Card Services  
Leonard Gelfand Center  
LGBTQ Resources  
Multicultural and Diversity Initiatives  
Opportunities for Involvement  
Parking and Transportation Services  
SafeWalk  
Survivor Support Network  
Shuttle and Escort Services  
Spiritual Development  
University Police  
Student Activities  
University Stores

#### Community Standards, Policies and Procedures

Alcohol and Drugs Policy  
AIDS Policy  
Bicycle/Wheeled Transportation Policy  
Damage to Carnegie Mellon Property  
Deadly Weapons  
Discriminatory Harassment  
Disorderly Conduct  
Equal Opportunity/Affirmative Action Policy  
Freedom of Expression Policy  
Health Insurance Policy

Immunization Policy  
Missing Student Protocol  
Non-Discrimination Policy  
On-Campus Emergencies  
Pets  
Political Activities  
Recycling Policy  
Riotous and Disorderly Behavior  
Safety Hazards  
Scheduling and Use of University Facilities  
Sexual Harassment and Sexual Assault Policy  
Smoking Policy  
Student Accounts Receivable and Collection Policy and Procedures  
Student Activities Fee  
Student Enterprises  
Workplace Threats and Violence Policy  
Statement of Assurance

## APPENDIX B: ADDITIONAL INFORMATION FOR CALIFORNIA PROGRAMS

Carnegie Mellon University is a private, non-profit institution, approved to operate in California by the California Bureau for Private Post-Secondary Education.

Any questions a student may have regarding this catalog that have not been satisfactorily answered by the institution may be directed to the Bureau for Private Postsecondary Education at 2535 Capitol Oaks Drive, Suite 400, Sacramento, CA 95833, [www.bppe.ca.gov](http://www.bppe.ca.gov), toll-free telephone number (888) 370-7589 or by fax (916) 263-1897.

As a prospective student, you are encouraged to review this catalog prior to signing an enrollment agreement. You are also encouraged to review the School Performance Fact Sheet, which must be provided to you prior to signing an enrollment agreement.

A student or any member of the public may file a complaint about this institution with the Bureau for Private Postsecondary Education by calling (888) 370-7589 toll-free or by completing a complaint form, which can be obtained on the bureau's internet website, at [www.bppe.ca.gov](http://www.bppe.ca.gov).

Class session will be held:

Carnegie Mellon University  
NASA Ames Research Park  
Bldg. 23 (MS 23-11)  
P.O. Box 1  
Moffett Field, CA 94035-0001  
(650) 603-7032  
[www.cmu.edu/silicon-valley](http://www.cmu.edu/silicon-valley)

### STUDENT'S RIGHT TO CANCEL (WITHDRAWAL/LEAVES OF ABSENCE)

1. A student has the right to cancel the student's Enrollment Agreement by either taking a leave of absence from the Program (leaving Carnegie Mellon University temporarily with the firm and stated intention of returning) or by withdrawing from the Program (leaving Carnegie Mellon University with no intention of returning). If the student withdraws or take a leave of absence from Carnegie Mellon University, the student may be eligible for a tuition adjustment or a refund of certain fees (excluding any Application Fee, Registration Fee and Enrollment Deposit, and any applicable Student Tuition Recovery Fund assessment).
2. To cancel the student's Enrollment Agreement and take a leave of absence or withdraw, the student must complete Carnegie Mellon University's Leave of Absence or Withdrawal form, as applicable, and return it to Carnegie Mellon University's Registrar's Office, at 5000 Forbes Ave., Warner Hall A12, Pittsburgh, PA 15213. The Leave of Absence and Withdrawal forms, and additional information of leaves of absence and withdrawal, can be found on Carnegie Mellon University's website, at <http://www.cmu.edu/hub/registration/leave.html>.



3. If the student notifies Carnegie Mellon University of the student's intent to withdraw or take a leave of absence, the student's official date of withdrawal or leave of absence is the earliest of:

The date the student began the student's withdrawal or leave of absence process at Carnegie Mellon University; The date the student notified the student's home department at Carnegie Mellon University;

The date the student notified the associate dean of the student's College at Carnegie Mellon University; or

The date the student notified the Carnegie Mellon University Dean of Student Affairs.

If the student does not notify Carnegie Mellon University of the student's intent to withdraw or take a leave of absence, the student's official date of withdrawal or leave of absence is:

The midpoint of the relevant semester in which the student withdraws or takes a leave of absence;

The last date the student attended an academically-related activity such as an exam, tutorial or study group, or the last day the student turned in a class assignment.

## REFUND POLICY

1. **Refunds in General.** Students who withdraw from the Program or take a leave of absence after having paid the current semester's tuition and fees or receiving financial aid are subject to the following refund and repayment policies. No other charges are refundable. Student Tuition Recovery Fund assessment, if any, is non-refundable.
2. **Exit Counseling.** All borrowers of Federal student loans must complete a Federally-mandated exit counseling session when graduating or dropping to less than half-time enrollment status, including by withdrawing or taking a leave of absence. Exit counseling prepares students for repayment. Students must complete an exit counseling session in its entirety, with complete and correct information; otherwise, the student's degree, diploma and official transcripts may be withheld. Information about exit counseling sessions can be found on Carnegie Mellon University's website, at <http://www.cmu.edu/finaid/loans/entrance-exit/exit.html>.
3. **Withdrawals/Leaves On or Before 10<sup>th</sup> Class Day.** Students who withdraw or take a leave of absence on or before the 10<sup>th</sup> class day of the relevant semester may receive a refund of 100% of tuition and fees (excluding any Application Fee or Registration Fee and Enrollment Deposit). STRF assessment, in any, is non-refundable.
4. **Withdrawals/Leaves after 10<sup>th</sup> Class Day.** Students who withdraw or take a leave of absence after the 10<sup>th</sup> class day of the relevant semester but before completing 60% of the semester will be assessed tuition based on the number of days completed

within the semester. This includes calendar days, class and non-class days, from the first day of classes to the last day of final exams. Breaks which last five days or longer, including the preceding and subsequent weekends, are not counted. Thanksgiving and Spring Break are not counted. There is no tuition adjustment after 60% of the semester is completed. There is no refund of fees after the 10<sup>th</sup> class day of the relevant semester.

5. **Tuition Adjustment Appeals.** Students may appeal to have tuition adjustments for their leave of absence or withdrawal if they feel that they have extenuating circumstances. These appeals will be reviewed in the context of Carnegie Mellon University's tuition adjustment policy, as stated above. These appeals must be made in writing to Carnegie Mellon University's Registrar using Carnegie Mellon University's Tuition Appeal Adjustment form. Information about Carnegie Mellon University's tuition adjustment policy, and tuition adjustment appeals, can be found on Carnegie Mellon University's website, at <http://www.cmu.edu/hub/tuition/adjustment.html>.
6. **Repayment to Lenders/Third Parties.** If any portion of refundable tuition and/or fees was paid from the proceeds of a loan or third party, the refund may be sent to the lender, third party or, if appropriate, to the Federal or state agency that guaranteed or reinsured the loan, as required by law and/or Carnegie Mellon University policy. Any amount of the refund in excess of the unpaid balance of the loan shall be first used to repay any student financial aid programs from which the student received benefits, in proportion to the amount of the benefits received, and any remaining amount shall be paid to the student.
7. **Responsibility for Loan.** If the student obtains a loan to pay for an educational program, the student will have the responsibility to repay the full amount of the loan plus interest, less the amount of any refund. If the student has received Federal student financial aid funds, the student is entitled to a refund of moneys not paid from Federal student financial aid program funds. If the student is eligible for a loan guaranteed by the Federal or state government and the student defaults on the loan, both of the following may occur: 1) The Federal or state government or a loan guarantee agency may take action against the student, including applying any income tax refund to which the person is entitled to reduce the balance owed on the loan. 2) The student may not be eligible for any other Federal student financial aid at another institution or other government assistance until the loan is repaid.

Meeting the cost of a graduate education is a significant investment. Carnegie Mellon University is committed to making it financially possible for graduate students to enhance educational development and reach their career goals. There are many financial aid resources available to students pursuing graduate studies at Carnegie Mellon University. Carnegie Mellon University participates in a number of Federal and state financial aid programs. Information about these financial aid programs can be found on Carnegie Mellon University's website, at <http://www.cmu.edu/finaid/index.html>.

If you obtain a loan to pay for the M.S. in Electrical and Computer Engineering or Software Engineering degree programs on the Silicon Valley campus, you will have the responsibility to repay the full amount of the loan plus interest, less the amount of any refund. If you have received federal student financial aid funds, you are entitled to a refund of moneys not paid from federal student financial aid program funds.

Carnegie Mellon University does not have a pending petition in bankruptcy, is not operating as a debtor in possession, and has not filed a petition in bankruptcy within the preceding 5 years, nor has Carnegie Mellon had a petition in bankruptcy filed against it within the preceding 5 years that resulted in re-organization under Chapter 11 of the United States Bankruptcy Code.

The State of California created the Student Tuition Recovery Fund (STRF) to receive or mitigate economic losses suffered by students in educational programs who are California residents or are enrolled in a residency program attending certain schools regulated by the Bureau for Private Postsecondary Education. You may be eligible for STRF if you are a California resident or are enrolled in a residency program, attending prepaid tuition, paid STRF assessment, and suffered an economic loss as a result of one of the following:

1. The school closed before the course of instruction was completed.
2. The school's failure to pay refund or charges on behalf of a student to a third party for license fees or any other purpose, or to provide equipment or materials for which a charge was collected within 180 days before the closure of the school.
3. The school's failure to pay or reimburse loan proceeds under a federally guaranteed student loan program as required by law or to pay or reimburse proceeds received by the school prior to closure in excess of tuition and other costs.
4. There was a material failure to comply with the Act or the Division within 30 days before the school closed or if the material failure began earlier than 30 days prior to closure, the period determined by the Bureau.
5. An inability after diligent efforts to prosecute, prove, and collect on a judgment against the institution for a violation of the Act. You must pay the state-imposed assessment for the Student Tuition

Recovery Fund (STRF) if all of the following applies to you:

1. You are a student in an educational program, who is a California resident or are enrolled in a residency program, and prepay all or part of your tuition either by cash guaranteed student loans, or personal loans, and
2. Your total charges are not paid by any third-party payer such as an employer, government program or other payer unless you have a separate agreement to repay the third party.

You are not eligible for protection from the STRF and you are not required to pay the STRF assessment if either of the following applies:

1. You are not a California resident, or are not enrolled in a residency program, or
2. Your total charges are not paid by any third-party payer such as an employer, government program or other payer unless you have a separate agreement to repay the third party.

NOTICE CONCERNING TRANSFERABILITY OF CREDITS AND CREDENTIALS EARNED AT OUR INSTITUTION The transferability of credits you earn at Carnegie Mellon University is at the complete discretion of an institution to which you may seek to transfer. Acceptance of the M.S. degree you earn in Electrical and Computer Engineering or Software Engineering is also at the complete discretion of the institution to which you may seek to transfer. If the credits or degree that you earn at this institution are not accepted at the institution to which you seek to transfer, you may be required to repeat some or all of your coursework at that institution. For this reason you should make certain that your attendance at this institution will meet your educational goals. This may include contacting an institution to which you may seek to transfer after attending Carnegie Mellon University to determine if your credits or degree will transfer.

Meeting the cost of a graduate education is a significant investment. Carnegie Mellon University is committed to making it financially possible for graduate students to enhance educational development and reach their career goals. There are many financial aid resources available to students pursuing graduate studies at Carnegie Mellon University. Carnegie Mellon University participates in a number of Federal and state financial aid programs. Information about these financial aid programs can be found on Carnegie Mellon University's website, at <http://www.cmu.edu/finaid/index.html>.

Carnegie Mellon University is accredited through a voluntary, peer-review process coordinated by the Middle States Commission on Higher Education (MSCHE or Middle States). MSCHE is one of six regional accrediting agencies in the United States, each accrediting institutions of higher education within a specific geographic region. Middle States is recognized by the U.S. Department of Education. This recognition enables MSCHE's member institutions to establish eligibility to participate in federal financial aid programs (e.g., federal loans, grants, and work-study) administered by the U.S. Department of Education. Carnegie Mellon University has been accredited by Middle States since 1921.

Please visit <http://www.cmu.edu/middlestates/> to learn more about accreditation standards and processes and to view the University's reaccreditation reports.

The address and telephone number for the Middle States Commission on Higher Education is 3624 Market Street, 2nd Floor West, Philadelphia, PA 19104, (267) 284-5000.

Appendix last updated: February 22, 2016



5000 Forbes Avenue

Pittsburgh, PA 15213

[www.ece.cmu.edu](http://www.ece.cmu.edu)

@CMU\_ECE