Electrical & Computer Engineering

2017-2018 M.S. Catalog/Handbook

ECE Office of Graduate Affairs

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www.cmu.edu

Carnegie Mellon University – Silicon Valley
NASA Ames Research Park
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TABLE OF CONTENTS

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 2017 US News and World Report ranks our graduate research programs in electrical and computer engineering 9th and 2nd 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 Master's 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 masters' students in Pittsburgh, Silicon Valley, and Africa.

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.

DEPARTMENTAL INFORMATION

University Personnel

Throughout your time in the M.S. 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 M.S. 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
- M.S. Academic Program Advisor: Nesli Ozdoganlar
- M.S. Academic program Advisor: Jillian McCarthy
- M.S./Ph.D. Academic Program Advisor in Silicon Valley: Stephanie Scott
- Ph.D. Academic Program Advisor: Nathan Snizaski
- 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 website at http://www.cmu.edu/hub/ under the navigation bar. 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. Information about these offices can be found in Appendix A of this handbook, or at the respective website.

- The Office of the Assistant Vice Provost for Graduate Education. Website: www.cmu.edu/graduate. Email: grad-ed@cmu.edu

- The Office of the Dean of Student Affairs. Website: 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
- Eberly Center for Teaching Excellence. Website: www.cmu.edu/teaching
- Graduate Student Assembly. Website: http://www.cmu.edu/stugov/gsa/index.html
- Intercultural Communication Center. Website: www.cmu.edu/icc
- Office of International Education. Website: http://www.studentaffairs.cmu.edu/oie/
- Counseling & Psychological Service. Website: www.studentaffairs.cmu.edu/counseling.
- Health Services. Website: www.cmu.edu/HealthServices
- University Police. Website: 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
- University Policies Website: www.cmu.edu/policies/

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

Department Resources

Academic Advisors and Faculty Mentors

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. Nesli Ozdoganlar, Jillian McCarthy, and Stephanie Scott are your academic advisors.

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 M.S. Academic Program Advisor administratively advises all ECE M.S. students throughout the entire duration of the M.S. 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.

Nesli can be reached by email: neslio@andrew.cmu.edu, by phone: (412) 268-6581, or in person in 1113 Hamerschlag Hall. To guarantee availability, you are encouraged to schedule an appointment with her by accessing her calendar in the signature block of her e-mail. Nesli advises Pittsburgh based MS students A-L, and Porto MS/MBA students.

Jillian can be reached by email: jrmccart@andrew.cmu.edu, by phone: (412) 268-3077, or in person in 1113 Hamerschlag Hall. To guarantee availability, you are encouraged

to schedule an appointment with her by accessing her calendar in the signature block of her e-mail. Jillian advises Pittsburgh based MS students M-Z, all IMB students and MS ECE students in CMU-Africa.

Stephanie can be reached by email: scottsm@andrew.cmu.edu, by phone: (650) 335-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 MS ECE and MS Software Engineering students.

Olga can be reached by email: gbuki@andrew.cmu.edu, by phone 250-784644833 or in person on the CMU Africa campus 4th floor Telecom House. Olga advises CMU-Africa based MS students.

Students will also be assigned a faculty mentor during the first two weeks of classes. A faculty mentor is a resource for questions related to specific content knowledge about ECE. They can also offer advice regarding future career and courses students may want to take to prepare. Whenever possible, faculty are matched to students based the area of interest indicated on the ECE application. Faculty mentor assignments and contact information will be sent out via e-mail prior to the first day of classes.

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

In Pittsburgh, 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

Silicon Valley campus

- The Silicon Valley Facilities will provide you with a key to the Master's 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.

Graduate Student Lounges

Pittsburgh campus

- The graduate student lounge in Pittsburgh is located in the top floor of Hamerschlag Hall. The Masters' student lounge is located Porter Hall B48/B54. Access to both spaces is given manually, but if you do not have access by the 3rd week of classes, please see Jessica Tomko in the Graduate Affairs Office (1113 HH).

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. 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. In an emergency, please contact NASA Police at 650-604-5555.

ECE 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 M.S. 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. 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 a faculty mentor. 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. If the student is concerned that they may be unable to complete degree requirements, they should contact their academic program advisor for assistance.

Degree Requirements Timeframe

The duration of the ECE program is three full-time semesters (fall-spring-fall, or spring-fall-spring). In order to have full-time status, students must enroll in at least 36 units each semester. In order to complete program requirements, students may need to enroll in more than 36 units per semester. The maximum number of units allowed in a semester is 48 units. Students are responsible for completing their enrollment each semester via their Student Information Online (SIO) portal. Students who are not enrolled by the tenth day of class will be withdrawn from the university.

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 will be given a 16 month I-20 or DS-2019.

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

Students are not required to continue their studies over the summer, as the summer semester is considered a vacation semester. However, students may choose to take courses for academic credit or pursue an internship that is relevant to their M.S. degree, if appropriate.

Eligible 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 and OIE's website on Employment Options for international students. Academic and OIE advisors will provide students with information about CPT during the spring semester.

Full and Part-time Requirements

The MS degree program is a full-time program in which students complete three full-time (36 units) semesters (including summer if summer is a student's final semester). Students who are interested and qualified may take an accelerated course load and complete the degree in two semesters and should consult with their advisor.

In extenuating circumstances, students may find that they may need to take a reduced course load. Extenuating circumstances that will be considered include medical reasons, initial academic difficulty due to problems with English language or the student being unfamiliar with U.S. teaching methods, or being placed in an improper course level. These students must submit an Authorization for a Reduced Course Load form to their academic advisor.

Part-time MS enrollment is an option available for students in special circumstances, such as students who would like to pursue an MS degree while maintaining external employment. Note that immigration regulations do not allow Carnegie Mellon University to issue visa documents for the part-time MS program.

Statute of Limitations

ECE adheres to CIT's policy on M.S. completion timelines. The CIT policy is as follows: "All units required for a masters degree in the College of Engineering, whether earned in residence or transferred from another institution, must be recorded on the transcript within six years of the date on which the student enrolled in the program." 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.

Campus Location Change

Students enrolled in the ECE master's program at the Pittsburgh, Silicon Valley, or CMU-Africa locations may be eligible to request to change residence to another campus after completing one semester of full-time study. Eligibility is determined by the details included in the student's admission offer and is explicitly stated in the admission offer letter. Due to limited space, location changes are not guaranteed and are subject to the discretion of the department. The students are responsible for all academic and financial impacts related to this change. Information about the location change process will be provided to eligible students.

International student internship eligibility will not be affected if students change location between Silicon Valley and Pittsburgh campuses. Locations changes between U.S. based campuses and CMU Africa will have implications for internship eligibility for international students. Please refer to OIE's website for employment options and consult with your OIE advisor for additional questions.

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.

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 M.S. If a student takes the same course twice, the course with the higher grade will be counted towards the ECE M.S. course requirements.

Maximum Units Allowed

No more than 120 units maximum should be taken while pursuing your degree. These units include courses taken for audit, pass/no pass, and withdrawal. Please refer to CIT policy on M.S. degree units for additional information.

If it becomes clear that a student will exceed the maximum units and not be able to maintain the required B average, the student may be dropped from the ECE or SE MS program.

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 may retake a prerequisite course in which they did not receive the minimum grade required.

All grades are recorded on the transcript and factored into the cumulative QPA; however, only the best 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.

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 who want to take a course pass/fail are required to register for the course and submit the pass/no pass approval form to their academic advisor for approval. If approved, the academic advisor will send the form to the HUB for processing.

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 to the GSC may include program or transfers, increase in units, course substitutions, and any other changes that are outside of the policies stated in the student handbook. Petitions are approved by the GSC. 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 M.S. 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.

Course Transfer Request Process

Up to 12-units of course taken at another university, whether taken before or after entering the ECE graduate program, may be transferred, providing that the course:

- Fulfills an ECE degree course requirement and is equivalent to a CMU 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 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.

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

1. Meet with academic 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
   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 CMU 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.

Research for Credit

Students can apply up to 15 units of research credit towards their MS degree requirements by registering for the 18-980, MS Research Project course. The number of units registered for should equal the number of hours you complete each week. For example, 12 units of research means the student should complete 12 hours of research each week. Alternative accommodations should be worked out with the supervising faculty member. Students are encouraged to wait until their second semester to pursue research or teaching opportunities.

The procedure to register for the MS Research Project course is as follows:

1. Identify a faculty member who is conducting research you would like to be involved with. You can search for faculty by research area in the ECE Faculty Directory.
2. Visit the ECE Graduate Program Forms website and print out the MS Research form.
3. Schedule an appointment or email the faculty with whom you wish to work with. Come prepared to the appointment with knowledge about that faculty member's area and potential research projects, if able. Discuss the project and agreed upon terms at the meeting. Secure the supervising faculty's signature.
   a. To receive credit, research must be completed with ECE faculty who are listed in the directory.

4. Return the form to your academic advisor. Your academic advisor will register you for the appropriate section of the MS research course, 18-980.

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

Due to the rigor of these programs, students are advised to take 36 units of courses each semester. However, we recognize that our student body is diverse, and that includes how each student handles their course load. While students may register for a maximum of 48 units each semester, we strongly recommend students take no more than 36 units each semester. Students unsure of whether they should take 48 units may should schedule an appointment with their academic advisor to discuss their reason for overloading and prepare a plan for how to handle the additional load.

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 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; students in Silicon Valley should email Brittany Reyes at 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". 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. You should consult with the instructor because it is up to their discretion whether or not a prerequisite course 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.

Research Assistant & Teaching Assistant Positions

Students are encouraged to wait until their second semester to pursue research or teaching opportunities.

Research for Credit

See the section titled "Research for Credit" for more information about receiving academic credit for research.

Research for Pay

Students are permitted to pursue research opportunities for pay in any department. Students should contact faculty members individually to inquire about opportunities available and provide information on their background. The supervising faculty can provide further information about payroll procedures.

Teaching Assistant Positions

There are several levels of teaching assistant opportunities available for ECE students. For complete information please visit the Teaching Opportunities website.

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 Evaluation & Certification of English Fluency for Instructors in the University Policies of this handbook.

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 absences are capped at two calendar years' total throughout the M.S. 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. IMB students who have declared their graduate degree but left CMU after completing their BS degree before having graduate status must also abide by this policy. Anyone who is intending to return to the program outside of the two-year leave (including CMU graduates with ECE BS degrees who have not declared their IMB prior to graduation) must re-apply to the graduate program. Questions can be addressed to the M.S. 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.

Returning from a Leave of Absence

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."

More information about the University's Leave of Absence and Withdrawal policies can be found in the University Policies section of this handbook.

Degree Certification Process & Commencement

A student must satisfy all degree requirements and achieve a minimum of 3.0 QPA in the courses being applied towards the required 96 units to be eligible for degree certification. 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.

Carnegie Mellon Commencement only occurs at the end of Spring semester. ECE holds a diploma ceremony at the end of spring semester as well. 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.

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.

The title of the degree students receive is Master of Science in Electrical and Computer Engineering or Master of Science in Software 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.

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 96 units. 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.

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.

M.S. DEGREE REQUIREMENTS

This section outlines the degree requirements for the Master's of Science in Electrical & Computer Engineering in Pittsburgh, Silicon Valley, CMU-Africa, and Technology Enhanced programs, and the Master's of Science in Software Engineering in Silicon Valley. ECE course list and course descriptions are available on the ECE course website: http://www.ece.cmu.edu/courses/index.html.

M.S. in Electrical & Computer Engineering

Each MS in ECE candidate must complete 96 units (1 unit = 1 hour of work) of coursework. These units are made up of the following degree requirements (A and B below):

A. ECE Core Graduate Coursework: 60 units

The ECE program requires 60 units of core coursework that may not be waived or substituted. These courses should be in the ECE Department (18) at the 600-level or above. Additionally, courses in the Computer Science Department at the 700 level or above can be counted. For exceptions to the rule and additional pre-approved courses

from other departments, please visit the MS ECE Course Requirements webpage: http://www.ece.cmu.edu/programs-admissions/masters/ms-requirements.html

B. Approved Electives: 36 units

Students have the opportunity to pursue a wide range of electives in which they have a special interest. These courses can be taken from the following departments:

B1. Restricted Electives: 24 units

Students have the opportunity to pursue a wide range of electives in which they have a special interest. For exceptions to the rule and additional pre-approved courses from other departments, please visit the MS ECE Course Requirements webpage: http://www.ece.cmu.edu/programs-admissions/masters/ms-requirements.html
Restricted elective courses can be taken from the following departments:

- Any ECE (18) course at the 500-level or above
- Any course at the 600-level or higher from one of the following colleges or programs:
  - Carnegie Institute of Technology (CIT) (39)
    - Biomedical Engineering (42)
    - Chemical Engineering (06)
    - Civil & Environmental Engineering (12)
    - Engineering & Public Policy (19)
    - Information Network Institute (14)
    - Integrated Innovation Institute (49)
    - Materials Science & Engineering (27)
    - Mechanical Engineering (24)
    - CMU-Africa (04)
  - Dietrich College of Humanities and Social Sciences
    - Statistics (36)
    - Center for the Neural Basis of Cognition (86)
  - Heinz School of Information Systems (95)
  - Heinz College-Wide Courses (94)
  - Mellon College of Science (MCS)
    - Biological Sciences (03)
    - Chemistry (09)
    - Mathematical Sciences (21)
    - Physics (33)
  - School of Computer Science (SCS)
    - Computational Biology (02)
    - Computer Science (15)
    - Entertainment Technology Center (53)
    - Institute for Software Research (08)
    - Robotics Institute (16)
    - Human-Computer Interaction Institute (05)
    - Language Technologies Institute (11)
    - Machine Learning (10)

- Software Engineering (17)
  - ○ Tepper School of Business (45)

B2. Less-Restricted Elective: 12 units

The remaining 12 units must be 300 level or greater from the same colleges, departments and programs listed above. Courses numbered as xx-299 or lower will not be counted toward the MS degree.

Three units of internship (18-994 Internship for Electrical and Computer Engineering Graduate Students) or professional development (39-699 CIT Professional Development Course) coursework may count towards the Less-Restricted Elective.

Integrated Master's/Bachelors Program

As students who are in the IMB program are pursuing the same degree as those in our professional master's program, they are required to adhere to the same requirements as other Professional MS students. This includes MS degree requirements, university policies, and CIT policies.

M.S. in Software Engineering (SE) (F2014)

For students entering the MS-SE program prior to Fall 2017.

Each M.S. in Software Engineering candidate must complete 96 (1 unit=1 hour of work) units of coursework. These units are made up of the following degree requirements (A and B):

A. ECE Core Graduate Coursework: 60 units

The ECE program requires 60 units of core coursework that may not be waived or substituted. Students are strongly advised to take 18-652, Foundations of Software Engineering, in their first semester. Some students may be exempted from taking 18-652 with significant, relevant industry experience, and should send an up-to-date resume to SE faculty Cecile Peraire and Hakan Erdogmus for approval. In addition to 18-652, it is also recommended that students take at least three additional core Software Engineering courses (courses in the range 18653-18659).

To complete the 60 units of core coursework, students should choose at least one course in each of the following three areas:

Software Engineering and Design:

- 18-652 Foundations of Software Engineering
- 18-653 Software Architecture
- 18-655 Service Oriented Computing
- 18-658 Software Requirements and Interaction Design

Analysis

- 18-654 Software Verification, Validation and Testing
- 18-657 Decision Analysis and Engineering Economics for Software Engineers
- 18-660 Numerical Methods for Engineering Design and Optimization

- 18-687 Analytical Performance Modeling
- 18-697 Statistical Discovery and Learning

Systems

- 18-638 Mobile Security
- 18-640 Foundations of Computer Architecture
- 18-644 Mobile Hardware for Software Engineers
- 18-645 How to Write Fast Code
- 18-646 Low-Power System-on-Chip Architecture
- 18-647 Connected Embedded Systems Architecture
- 18-656 Data-Intensive Workflow Development for Software Engineers
- 18-659 Software Engineering Methods
- 18-842 Distributed Systems
- 18-843 Mobile and Pervasive Computing

The remaining 24 units can be additional coursework in the above areas or 12 units of a graduate research project (18-980).

B. Approved Electives: 36 units

Students have the opportunity to pursue a wide range of electives in which they have a special interest. Approved elective courses can be taken from the following departments (for exceptions to the rule and additional pre-approved courses from other departments, please visit the MS SE Course Requirements webpage: http://www.ece.cmu.edu/programs-admissions/ms-in-se/requirements.html

B1. Restricted Electives: 24 units

- Any ECE (18) course at the 500-level or above
- Any course at the 600-level or higher from one of the following colleges or programs:
  - Information Network Institute (14)
  - Integrated Innovation Institute (49)
- Select courses from other departments offered on the Silicon Valley campus (listed on the schedule of classes with a section location in Silicon Valley), including:
  - 15-619
  - 10-601

B2. Less-Restricted Elective: 12 units

The remaining 12 units may be at the undergraduate level from the same colleges, departments and programs listed above.

Three units of internship (18-994 Internship for Electrical and Computer Engineering Graduate Students) or professional development (39-699 CIT Professional Development Course) coursework may count towards the Less-Restricted Elective.

M.S. in Software Engineering (SE) (F2017)

For students entering the MS-SE program during or after Fall 2017.

Each MS in Software Engineering candidate must complete 96 (1 unit=1 hour of work) units of coursework. These units are made up of the following degree requirements (A and B):

A.   ECE Core Graduate Coursework: 60 units

The ECE program requires 60 units of core coursework that may not be waived or substituted. Students are required to take 18-652, Foundations of Software Engineering, in their first semester. Some students may be exempted from taking 18-652 with significant, relevant industry experience, and should send an up-to-date resume to SE faculty Cecile Peraire and Hakan Erdogmus for approval. In addition to 18-652, it is also recommended that students take at least three additional core Software Engineering courses (in the range 18653-18659).

To complete the 60 units of core coursework, students should choose at least one course in each of the following three areas:

Software Engineering and Design

- 18-652 Foundations of Software Engineering
- 18-653 Software Architecture
- 18-658 Software Requirements and Interaction Design

Analysis

- 18-654 Software Verification, Validation and Testing
- 18-656 Data Intensive Workflow Development for Software Engineers
- 18-657 Decision Analysis and Engineering Economics for Software Engineers
- 18-697 Statistical Discovery and Learning

Systems

- 18-600 Foundations of Computer Systems
- 18-638 Mobile Security
- 18-644 Mobile Hardware for Software Engineers
- 18-645 How to Write Fast Code
- 18-655 Service Oriented Computing
- 18-659 Software Engineering Methods
- 18-747 Wireless Device Architecture
- 18-842 Distributed Systems
- 18-843 Mobile and Pervasive Computing

The remaining 24 units can be additional coursework in the above areas or 12 units of a graduate research project (18-980).

B. Approved Electives: 36 units

Students have the opportunity to pursue a wide range of electives in which they have a special interest. These courses can be taken from the following departments (for exceptions to the rule and additional pre-approved courses from other departments, please visit the MS SE Course Requirements webpage:

http://www.ece.cmu.edu/programs-admissions/ms-in-se/requirements.html

B1. Restricted Electives: 24 units

- Any ECE (18) course at the 500-level or above
- Any course at the 600-level or higher from one of the following colleges or programs:
  - o Information Network Institute (14)
  - o Integrated Innovation Institute (49)
- Select courses from other departments offered on the Silicon Valley campus (listed on the schedule of classes with a section location in Silicon Valley), including:
  - o 15-619
  - o 10-601

B2. Less-Restricted Elective: 12 units

The remaining 12 units may be at the undergraduate level from the same colleges, departments and programs listed above.

Three units of internship (18-994 Internship for Electrical and Computer Engineering Graduate Students) or professional development (39-699 CIT Professional Development Course) coursework may count towards the Less-Restricted Elective.

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 96 units for any MS program in the Department of Electrical and Computer Engineering. Mini courses worth 12 units cannot be used towards the required 96 units. Students are responsible for checking the syllabi for classes to ensure their courses meet these requirements.

Internship 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 (18-994 Internship for Electrical and Computer Engineering Graduate Students), which can be taken once throughout the student's ECE MS degree program of study, and is offered only during the summer. This internship will appear on a student's transcript and tuition will charged for 3 units. Please 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 to the less restricted elective 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 AND FEES

As indicated in your admission offer letter, ECE does not offer financial assistance for our master's students. Unless otherwise arranged and approved in advance, ECE students are full-time and will be charged full-time ECE tuition.

Tuition Billing & Payments

The tuition rate for students entering ECE programs is set in the spring for the class entering in the following fall semester. Tuition for a student's second fall semester will likely increase in accordance with the tuition increase for the new academic year. The tuition will increase approximately 3% per year.

Students will be charged tuition per semester for each semester in which they are enrolled. Summer courses, if taken, are charged additional tuition. The tuition billing and payment process for all ECE students is handled centrally by The HUB. For university billing and payment policies, please refer to The HUB's Billing and Payments website.

Part-Time Students

Part-time students will be charged tuition at the per-unit rate. Arranging to pay per-unit is a convenience and not intended to reduce the overall costs of the program. Be sure that if you intend to be enrolled as a part-time student, your schedule reflects this by the tenth day of classes.

If you are planning to pursue part-time coursework (<36 units), if you register full-time (>35 units) at any point in that semester, you will be assessed the full-time tuition rate and no refund will be granted. If you are pursuing part-time coursework, be sure to consult with your academic advisor before changing your course schedule.

University Financial Aid

Graduate Students should consult the graduate student financial aid information. Students will find the Graduate Financial Aid Guide, information about funding options, how to apply for financial aid and other helpful links.

Graduate students who find themselves in need of immediate funds for emergency situation should contact the Office of the Dean of Student Affairs to inquire about an Emergency Situation Loan.

Student Financial Obligation

ECE students are subject to and must be aware of the Carnegie Mellon policy regarding student financial obligation.

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 searched 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 the "Leave of Absence" section 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

Safeguarding Educational Equity – Sexual Harassment and Sexual Assault Policy

Sexual harassment and sexual assault are specifically prohibited by Carnegie Mellon University, as is retaliation for having brought forward a concern or allegation. This policy is intended to clearly identify violations of this standard, provide resources to deal with their effects, and describe detailed procedures to address complaints of sexual harassment, including sexual assault. The complete policy can be found at the following link: http://www.cmu.edu/policies/administrative-and-governance/sexual-harassment-and-sexual-assault.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 or 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

Withdrawal from Program

Students are able to withdraw from the department at any time. Prior to withdrawing, students should discuss their decision with their faculty advisor(s) and the Graduate Affairs Office. Students will be required to fill out the Withdrawal form located on The Hub website. International students must consult with OIE prior to filing a withdrawal form as there will be visa repercussions.

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 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; 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

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.

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. 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

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:

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 (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

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. 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/

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/

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

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.

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.

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

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/

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.

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

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, 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.

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

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 10th Class Day.** Students who withdraw or take a leave of absence on or before the 10th 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 10th Class Day.** Students who withdraw or take a leave of absence after the 10th 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 10th 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 change 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.

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