GRADUATE STUDY HANDBOOK

MASTERS DEGREE

THE
DEPARTMENT
OF

ELECTRICAL & SYSTEMS ENGINEERING

University of Pennsylvania

Academic Year 2010-11
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I. INTRODUCTION

Welcome to the Electrical and Systems Engineering Graduate Group! The ESE Graduate Group offers various graduate education options. Students can pursue a Ph.D. degree in Electrical and Systems Engineering, a Master of Science in Engineering (MSE) in Electrical Engineering, an MSE in Systems Engineering or an MSE in Telecommunications and Networking. Exceptional undergraduate students also have a chance to submatriculate to an MSE degree while pursuing their Bachelor of Science (B.S.) degree.

This handbook describes the most important rules and regulations regarding the Master’s degrees offered in the Department of Electrical & Systems Engineering. It also provides other useful information for graduate students. As well, it is designed to acquaint new students with the policies and procedures of the Electrical & Systems Engineering Graduate Group.

School-wide rules and regulations apply to all ESE graduate students in the School of Engineering and Applied Science. This document presents additional specifications and details for graduate students in the Electrical & Systems Engineering Graduate Group. Additional and most up-to-date information on the Electrical & Systems Graduate Group program, faculty and staff can be found on our web site http://www.ese.upenn.edu.
**IMMEDIATE RESOURCES**
When you first enter the program, there are a few individuals who are important to know. These are:

**ADMINISTRATIVE COORDINATOR FOR GRADUATE PROGRAMS:**

**NICHOLE WOOD**
Office: 203 Moore Building. Telephone 215-898-9390 or woodn@seas.upenn.edu

The Administrative Coordinator is your primary contact person with the Electrical & Systems Engineering graduate programs. She will provide you detailed information about the graduate programs, registration, grades, policy and procedures as well as assist you with forms you may need to make changes or adjustments to your program.

**ACADEMIC ADVISOR:**

Your Academic Advisor will most likely be the first faculty member you meet as a graduate student in our program. Their role will change during the course of your graduate studies, but their primary duty will be to help you design your academic program of courses to meet your own research goals within the requirements of the graduate program.

**GRADUATE CHAIR:**

The Graduate Group Chair oversees the running of the Electrical & Systems Engineering Masters and Ph.D. programs.
II. DEGREE REQUIREMENTS

M.S.E. IN ELECTRICAL ENGINEERING
The Masters program in ESE is not only flexible, but also gives you a choice of the “non-thesis” and the “thesis” option. The requirement for the M.S.E. degree in Electrical Engineering is the satisfactory completion of an approved program of 10 course units. A 2.7 GPA is required to graduate with a Masters degree. The requirements are also listed on our website at: http://www.ese.upenn.edu.

Requirements for the MSE degree in Electrical Engineering
Students must complete 10 course units, following the requirements below. If a Master’s thesis is done, it will count for 2 course units (2 c.u. of ESE 599).

The four-part requirements are as follows:
A. Four Courses (4) from a Specific List of ESE Courses
B. Two Courses (2) from an expanded list of ESE Courses
C. One (1) SEAS course
D. Three (3) Electives

A. Four (4) courses from the Specific List of courses:

ESE 500 Linear Systems Theory
ESE 504 Introduction to Optimization Theory
ESE 505 Control of Systems
ESE 509 Waves, Fibers and Antennas of Telecommunications (also TCOM 503)
ESE 510 Electromagnetic and Optical Theory
ESE 511 Modern Optics and Image Understanding
ESE 521 Semiconductor Device Physics and Technology
ESE 525 Nanoscale Science and Engineering
ESE 531 Digital Signal Processing
ESE 534 Computer Organization
ESE 535 Electronic Design Automation
ESE 539 Neural Networks, Chaos and Dynamics: Theory and Application
ESE 570 Digital Integrated Circuits and VLSI- Fundamentals
ESE 572 Analog Integrated Circuits
ESE 574 Principles and Practice of Microfabrication Technology
ESE 575 Introduction to Wireless Systems (also TCOM 511)
ESE 576 Digital Communication Systems
TCOM500 Introduction to Networks and Protocols
ENM 503 Probability

B. Two (2) further courses from the Specific List and/or following courses:

ESE 514 Physics of Materials I
ESE 517 Optical Imaging
ESE 519 Real-Time & Embedded Systems
ESE 529 RF MEMS
ESE 601 Hybrid Systems
ESE 605 Modern Convex Optimization
ESE 610 Electromagnetic and Optical Theory II
ESE 617   Non-Linear Control Theory
ESE 632   Random Process Models and Optimum Filtering
ESE 650   Learning in Robotics
ESE 674   Information Theory
ESE 680   Special Topics
ESE 599   Independent Study
ESE 597   Thesis Research (up to 2 course units for thesis option)

C. One (1) SEAS course

One course unit from any graduate offerings in: ESE, CIS, MEAM, TCOM, CIT, EAS, or ENM

D. Three (3) Electives

Three course units from any graduate courses offered in SEAS, SAS*, or Wharton

(*ex: technical and/or scientific content courses will mostly be approved- see graduate coordinator)

Notes & Exceptions for EE degree:

1. Thesis Option - Students who would like to complete a thesis may take two (2) units of ESE 597 (Thesis Research) under the expanded list.
2. A maximum of one course unit of Independent Study (ESE 599) is allowed.
3. A maximum of two CIT course is allowed for the MSE in EE degree.
4. Maximum two graduate-level course units may be transferred from another school to apply toward the MSE degree. These two courses should not have been used in fulfillment of an undergraduate or graduate degree.
5. Full time Masters’ degree students can register for three to five courses maintaining a 2.7 GPA. Students who want to register for more than four units a semester must get permission from the graduate chair.
6. Lockheed-Martin Transfer credit: Lockheed Martin students must petition for transfer credit in person, and bring a letter from the Company (your supervisor), clearly stating which Advanced Courses you completed and the final grade(s) awarded. All documents should be given to Betty Gentner, located in 111 Towne Building.
7. DISALLOWED COURSES FOR ANY GRADUATE DEGREE IN SEAS.

A reminder that no undergraduate level courses (below 500 level), including those in SEAS, may be taken for a graduate degree requirement. GAFL 502: Public Speaking can not be used towards your MSE degree in engineering. There are courses that appear at the graduate level that are being offered by other parts of the University that will not be approved for SEAS graduate degree requirements. These include courses being offered in specialized and professional training programs, such as the Organizational Dynamics Program, the Wharton Certificate Programs for Working Professionals, and the Wharton Evening School. EAS 503: Energy Systems and Policy and EAS 505: Climate Policy and Technology DO NOT count towards graduate degree requirements. These are undergraduate level courses.

EAS 502: Public Speaking
M.S.E. IN SYSTEMS ENGINEERING
Students entering the Master of Science in Systems Engineering (M.S.E.) program usually have baccalaureate degrees in the engineering, mathematical, physical, or economic sciences, although many students with other backgrounds who have a facility with quantitative and computer analyses also matriculate. The requirement for the M.S.E. degree in Systems Engineering is the satisfactory completion of an approved program of 10 course units. A 2.7 GPA is required to graduate with a Masters degree. The requirements are also listed on our website at: http://www.ese.upenn.edu (A thesis is optional).

Requirements for the MSE degree in Systems Engineering
Students must complete 10 course units, following the requirements below. If a Master’s thesis is done, it will count for 2 course units (2 c.u. of ESE 599).

The four-part requirements are as follows:
A. Four Courses (4) in Required Courses
B. Two Courses (2) from a list of ESE Courses
C. One (1) SEAS course
D. Three (3) Electives

A. Four (4) courses from Required Courses:
ENM 503 Probability
ESE 504 Introduction to Optimization Theory
ESE 540 Engineering Economics
ESE 603 Simulation Modeling and Analysis

B. Two (2) courses from the following list of ESE Courses:
ESE 500 Linear Systems Theory
ESE 502 Introduction to Spatial Analysis
ESE 505 Control of Systems
ESE 508 Information Systems for E-Commerce
ESE 544 Project Management
ESE 552 Transportation and Systems Engineering
ESE 554 Urban Transit Systems and Technology
ESE 555 Cities and Transportation Systems
ESE 560 Sustainable Energy
ESE 567 Risk Analysis and Environmental Management
ESE 590 Systems Methodology
ESE 601 Hybrid Systems
ESE 605 Modern Convex Optimization
ESE 608 Intelligent and Animated Software Agents
ESE 617 Non-Linear Control Theory
ESE 632 Random Process Models and Optimum Filtering
ESE 650 Learning in Robotics
TCOM500 Introduction to Networks and Protocols
ESE 680 Special Topics
ESE 599 Independent Study
ESE 597 Thesis Research (up to 2 course units for thesis option)
C. One (1) SEAS course

One course unit from any graduate offerings in: ESE, CIS, MEAM, TCOM, CIT, EAS, or ENM

D. Three (3) Electives

Three course units from any graduate courses offered in SEAS, SAS*, or Wharton

(*ex: technical and/or scientific content courses will mostly be approved- see graduate coordinator)

Notes & Exceptions for SE degree:

1. **Thesis Option**- Students who would like to complete a thesis may take two (2) units of ESE 597 (Thesis Research) under the list of ESE courses.
2. A maximum of **one course unit** of Independent Study (ESE 599) is allowed.
3. A maximum of **two CIT** course is allowed for the MSE in SE degree.
4. Maximum two graduate-level course units may be transferred from another school to apply toward the MSE degree. These two courses should not have been used in fulfillment of an undergraduate or graduate degree.
5. Full time Masters’ degree students can register for three to five courses maintaining a 2.7 GPA. **Students who want to take more than four units a semester must get approval from the graduate chair.**
6. **Lockheed-Martin Transfer credit:** Lockheed Martin students must petition for transfer credit in person, and bring a letter from the Company (your supervisor), clearly stating which Advanced Courses you completed and the final grade(s) awarded. All documents should be given to Betty Gentner, located in 111 Towne Building.
7. **DISALLOWED COURSES FOR ANY GRADUATE DEGREE IN SEAS.**
   A reminder that no undergraduate level courses (below 500 level), including those in SEAS, may be taken for a graduate degree requirement. **GAFL 502: Public Speaking** can *not* be used towards your MSE degree in engineering. There are courses that appear at the graduate level that are being offered by other parts of the University that will *not* be approved for SEAS graduate degree requirements. These include courses being offered in specialized and professional training programs, such as the Organizational Dynamics Program, the Wharton Certificate Programs for Working Professionals, and the Wharton Evening School. **EAS 503: Energy Systems and Policy and EAS 505: Climate Policy and Technology** DO NOT count towards graduate degree requirements. These are undergraduate level courses.
M.S.E. IN TELECOMMUNICATIONS AND NETWORKING
Courses under the M.S.E. in Telecommunications and Networking (TCOM) cover a broad range of telecommunications and networking issues while reinforcing a systems approach. The requirement for the M.S.E. degree in Telecommunications and Networking is the satisfactory completion of an approved program of 10 course units. **A 2.7 GPA is required to graduate with a Masters degree.** The requirements are also listed on our website at: [http://www.ese.upenn.edu](http://www.ese.upenn.edu).

Requirements for the MSE degree in TCOM
Students must complete 10 course units, following the requirements below. If a Master’s thesis is done, it will count for 2 course units (2 c.u. of TCOM 599).

The four-part requirements are as follows:
A. **Two Courses (2) in Required Courses**
B. **Three (3) TCOM Electives**
C. **Two (2) Technical Electives**
D. **Three (3) Other Electives**

A. **Two (2) courses from Required Courses:**

TCOM 500  Introduction to Networks and Protocols
TCOM 502  Advanced Networking Protocols

B. **Three (3) TCOM Electives:**

Any three TCOM courses

C. **Two (2) Technical Electives:**

Two course units from any graduate offerings in: TCOM, ESE, CIS, CIT or ENM courses

D. **Three (3) Other Electives:**

Three course units from any graduate courses offered in TCOM, ESE, CIS, ENM, EAS or Wharton courses.

Notes & Exceptions for TCOM degree:

1. **Thesis Option**- Students who would like to complete a thesis may take two (2) units of TCOM 597 (Thesis Research).
2. A maximum of two CIT courses are allowed for the MSE in TCOM degree
3. A maximum of one course unit of Independent Study (TCOM 599) is allowed
4. A maximum of two graduate-level course units may be transferred from another school to apply toward the MSE degree. These two courses should not have been used in fulfillment of an undergraduate or graduate degree.
5. Full time Masters’ degree students can register for three to five courses maintaining a 2.7 GPA. **Students who want to take more than four units a semester must get approval from the graduate chair.**
6. Lockheed-Martin Transfer credit: Lockheed Martin students must petition for transfer credit in person, and bring a letter from the Company (your supervisor), clearly stating which Advanced Courses you completed and the final grade(s) awarded. All documents should be given to Betty Gentner, located in 111 Towne Building.
Disallowed courses for any graduate degree in SEAS: A reminder that no undergraduate level courses (below 500 level), including those in SEAS, may be taken for a graduate degree requirement. **GAFL 502:** Public Speaking can not be used towards your MSE degree in engineering. There are courses that appear at the graduate level that are being offered by other parts of the University that will not be approved for SEAS graduate degree requirements. These include courses being offered in specialized and professional training programs, such as the Organizational Dynamics Program, the Wharton Certificate Programs for Working Professionals, and the Wharton Evening School. **EAS 503: Energy Systems and Policy and EAS 505:** Climate Policy and Technology DO NOT count towards graduate degree requirements. These are undergraduate level courses.
III. POLICIES & PROCEDURES BEYOND DEGREE REQUIREMENTS

COURSE PLANNING GUIDE
Students must submit a Course Planning Guide before their second semester to their Academic Advisor for approval. The original will be added to your school file and you should keep a copy for your records. Forms are located online at http://www.ese.upenn.edu/grad/regulations.html or in the office, 203 Moore.

REGISTRATION
Directions and procedures for registering using the PennInTouch registration system are available from https://sentry.isc.upenn.edu/intouch.

IMPORTANT NOTE: During the registration period each semester, ESE graduate students are placed on an administrative “hold” to insure that students consult with their advisors before registering for classes. Before you can register using PennInTouch, the hold must be cleared, either by submitting the Faculty Advisor Sign-Off Form signed by both student and advisor or by an email from the advisor to the Graduate Coordinator. Once the “hold” is released, student can register; add/drop courses, etc. using PennInTouch.

You’ll find yourself on “Registration Hold” if;
1) you are full-time and have not enrolled for student health coverage. All full-time students are required to have student health coverage.
2) you are part-time and have health coverage thru your employer and did not notify Student Health.
3) you have neglected to provide Student Health with proof of immunization.
4) you have an outstanding bursar bill.

Please contact the graduate coordinator at 215-898-9390, e-mail, (woodn@seas.upenn.edu) or stop by the office, 203 Moore Bldg.

PETITION FOR ACTION
Students must submit a Petition for Action form (http://www.seas.upenn.edu/graduate/advising/forms-g.php), if you are requesting permission to alter program requirements. The Petition must be approved by your advisor, graduate chair and associate dean. (Example: requesting to waive a required core course that you have already mastered).

TRANSFER OF CREDIT
Penn Engineering Masters degree candidates are permitted to transfer a maximum of two graduate courses from another university. These two courses should not have been used in fulfillment of an undergraduate or graduate degree. Students are required to complete the Graduate Transfer of Credit Petition form (http://www.ese.upenn.edu/grad/regulations.html) and it must be approved by the faculty teaching the equivalent SEAS course, the Graduate Group Chair and Associate Dean for Academic Affairs.
IV. GENERAL INFORMATION

FULL AND PART-TIME STUDY
U.S. citizens may enroll in any of these programs on a part-time or full-time basis. However, international students on student visas must enroll in a full-time program to maintain their visa status. Full-time Master degree students can register for three to five courses per semester maintaining a 2.7 GPA. Part-time students enrolled in a M.S.E. program must register for at least one course unit during the fall and spring semesters in order to remain continuously enrolled in their programs. A minimum 2.7 GPA is required to graduate with a Masters Degree in ALL Master’s programs.

TIME LIMIT
Master Degree: Full-time and part-time candidates must complete these requirements within seven years of their matriculation at Penn.

STUDENT HEALTH
The University requires all full-time students to have health insurance. Students must provide information about their insurance coverage each year. All students must submit either a waiver or an enrollment form to the Student Health Insurance Office. Please visit the Student Health Insurance website at http://www.vpul.upenn.edu/shs/html. The Student Health office will place a hold on your registration if you do not submit any one of the documents mentioned above.

*You may submit your waiver online through your Penn InTouch account.

DUAL MAJOR FOR M.S.E. DEGREE
To double major in Penn Engineering, a student must obtain the approval of the Graduate Group Chairs of both departments and the Associate Dean for Academic Affairs. On the form entitled “Application for the Dual Master’s Degree in Penn Engineering,” the student must outline his or her program of study in both majors. A minimum of seventeen course units must be completed. A minimum of eighteen must be completed for the Biotechnology Program. A maximum of three courses can be double counted (the total minus those three must equal 17 or 18). The student must request approval of his/her dual-major program from both graduate groups before completing six courses or two semesters.

ADVANCED REGISTRATION
The Advanced Registration period is always held in March for the coming fall term and in November for the coming spring term. All students are required to register during this period. Contact the graduate coordinator to remove the hold on your registration.

DISALLOWED COURSES FOR GRADUATE STUDENTS
The following types of courses may not be taken to satisfy requirements for a SEAS graduate degree:
1) Undergraduate level courses (below 500 level)
2) Courses that will not count are:
   a. Wharton Evening (these are actually undergraduate level)
   b. Wharton Certificate Program for Working Professionals (usually 4XX numbered courses. These are actually the same courses as Wharton Evening)
   c. Organizational Dynamics (a SAS offered master's level program)
   d. GAFL: Public Speaking
   e. EAS 503: Energy Systems and Policy and EAS 505: Climate Policy and Technology DO NOT count towards graduate degree requirements. These are undergraduate level courses.
NOTE: Law School courses are “semester hours” NOT “credit units”. Law School course(s) may not have the same credit weight as Engineering.

**CPT-IS: CURRICULAR PRACTICAL TRAINING FOR INTERNATIONAL STUDENTS**
Graduate students in SEAS who meet the USCIS eligibility criteria (see below) may apply for independent study (IS) academic credit for the purposes of F-1 curricular practical training (CPT). The procedure is as follows: (additional information can be found at: [www.seas.upenn.edu/grad/cpt.html](http://www.seas.upenn.edu/grad/cpt.html))

1) Identify a faculty member who will serve as your “CPT-IS Supervisor”. Your CPT-IS Supervisor’s area of work and specialization should substantially overlap with your proposed internship work.

2) 2). Get the approval of that individual on a Proposal (2 pages max.) for the work you will do on your internship. Your proposal should describe:
   a. The tasks you will undertake
   b. The technical content of your work/internship
   c. The materials you will submit at the end of your CPT-IS period for final evaluation

3) Your employer should provide a letter or email to your CPT-IS Supervisor and for inclusion in your entire application package, verifying support for the work you propose to do.

4) Submit the Application for CPT-IS Form with all approvals to SEAS Office of Academic Programs (111 Towne) for final approval by the Associate Dean/designee.

5) Submit the F-1 Curricular Practical Training Form.

6) Once approved by the Associate Dean/designee, you are responsible for taking the approved application to Penn’s International Student and Scholar Services (ISSS) office to request curricular practical training authorization. Processing time by ISSS is typically 2 business days. **Students may not begin any work until they have received the CPT authorization from ISSS.**

**USCIS eligibility criteria:** In order to be eligible for CPT-IS, you must have already completed one academic year (September to May) of course work full-time at Penn but have not completed your degree requirements. (Note: A student beginning his/her program in January would be able to register for CPT-IS after a second term of full-time study). If you have any questions regarding the CPT information status requirement, please meet with your advisor at ISSS.

Please note the following:

- **Evaluation and grading:** Your CPT-IS Supervisor will need to evaluate your work done either based on periodic reports submitted by you while undergoing the CPT, or based on such reports immediately after your return from the training. Note that your supervisor may require some additional work beyond what was done during training, but the evaluation must be substantially based upon the training experience. All CPT-IS course registrations will be issued either an “S” or a “U” grade. No letter grades (impacting GPA) will be issued.

- **Mid-Point Progress Report:** You are required to submit a completed “Mid-Point Progress Report” during your CPT period.

- **Final Report:** You are required to submit a completed “Final Report” to your CPT-IS Supervisor at the end of your CPT-IS period.

- **Course Registration:** Upon final approval as indicated by this form, you will be registered for course credit during the term of the CPT. Master’s students will be registered for EAS 897 and PhD students will be registered for EAS 898.

- **Satisfying Degree Requirements, Tuition and Fees:**
  - Master’s students entering Fall 2008 who register for CPT-IS will be placed into the “Master’s with Practicum” degree. The CPT-IS course (EAS 897) will be a required 11th
CU in completing the “Master’s with Practicum” degree. No tuition and fees will be charged for this option.

- PhD students must consult with their Faculty Advisor and Graduate Group Chair regarding how CPT-IS (EAS 898) may be used to satisfy degree requirements. No tuition and fees will be charged for this option.

- **Requirement to Complete:** All academic requirements for CPT-IS must be satisfactorily completed within the term for which the student has registered for CPT-IS. Failure to complete the CPT-IS academic requirements would render your employment “unauthorized” and be a violation of your immigration status. For any student who gets a “U” grade, such sanctions may include forfeiture of the post-graduation OPT allotment and the possibility of working in the United States on any other visa.

### LOW GRADE RECEIVED IN REQUIRED COURSE(S)

If a grade of D or F is received in a required course, which prevents graduation, the student has three options:

1. At the discretion of the instructor, the student can work with the instructor to improve the grade to C or higher with additional course work.
2. At the discretion of the instructor, the student can retake the course by attending the course again (in a subsequent term) without registering or paying additional tuition, and will receive a grade change if earned.
3. If instructor does not agree to either (1) or (2), the student’s only option is to register and pay tuition for the course again. Upon successful completion of the retake, the original registration will be changed to “withdraw”. [Thus the original course CU and grade will not be counted toward graduation CUs or GPA; i.e., SEAS will not allow the course to be counted twice toward the degree.]

### RETAKING A COURSE

No course may be retaken/re-registered to improve a grade of “C” unless the content is different. (Students may, with instructor’s permission, do additional work to improve this grade). Graduation may not be postponed for grade improvement if all other graduation criteria are met.

### PETITION TO WAIVE CORE COURSE

Students may petition to waive a required core course in their program of study (Systems and TCOM majors). If a student chooses to waive a required core course, they must ask for the waiver before the end of the Add/Drop period in their first semester. This is to ensure that students are not locked out of a course they ultimately would need to take in case the waiver is not granted. No waiver will be granted after the end of the Add/Drop period of their first semester of study.

### TRANSFERS INTO ESE/WITHIN ESE

A student who wishes to transfer into or within the ESE Graduate Group from another graduate group must have a GPA of 3.0, in addition to meeting the other admissions criteria, along with brief description of why you wish to transfer. The student should complete the SEAS Transfer of Graduate Group Form ([http://www.seas.upenn.edu/graduate/advising/forms-g.php](http://www.seas.upenn.edu/graduate/advising/forms-g.php)) and submit it to the Graduate Group Chairs of the new department and old department for approval. **NOTE:** New students will not be allowed to request a transfer of graduate groups until they have completed one semester in their current graduate group and have at least a 3.0 GPA at the end of the semester.
**LEAVE OF ABSENCE/WITHDRAWAL**

In the case of a student needing to take a leave of absence or withdrawal from the School of Engineering and Applied Science, a Petition for Action form ([http://www.seas.upenn.edu/graduate/advising/forms-g.php](http://www.seas.upenn.edu/graduate/advising/forms-g.php)) must be completed and signed by the faculty advisor, graduate chair and associate dean. Reinstatement is dependent upon departmental and SEAS approval.

Students should try to drop classes during the add/drop period to avoid financial penalty. If a student withdraws from a class after the add/drop period, the “Withdrawal from a Course” petition, [www.seas.upenn.edu/graduate/advising/forms-g.php](http://www.seas.upenn.edu/graduate/advising/forms-g.php) is used.

**GRADUATION**

Students planning to graduate must register for graduation on or before the deadline set by the SEAS Graduate Office. Forms are available online: [http://www.seas.upenn.edu/graduate/advising/forms-g.php](http://www.seas.upenn.edu/graduate/advising/forms-g.php), or in the Graduate Office, room 111 Towne Building. There is a $25.00 late charge fee.

*Graduate Forms can be found online at:*

[http://www.seas.upenn.edu/graduate/advising/forms-g.php](http://www.seas.upenn.edu/graduate/advising/forms-g.php)

For more information pertaining to SEAS graduate students please review the Penn Engineering Graduate Student Handbook at:

[http://www.seas.upenn.edu/graduate/handbook/index.php](http://www.seas.upenn.edu/graduate/handbook/index.php)