M.S.E. in Electrical Engineering Requirements (for students starting Fall 2012 and later)

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 597).

The four-part requirements are as follows:

A. Four (4) Courses from the Specific List of ESE Courses
B. Two (2) Courses from the Specific List (Section A) and/or Expanded List of Courses
C. One (1) Technical Elective
D. Three (3) Other 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 TCOM503)
- 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 576 Digital Communication Systems
- TCOM 500 Introduction to Networks and Protocols
- ENM 503 Probability or ESE 530 Elements of Probability Theory

B. Two (2) Courses from the Specific List (Section A) and/or the Following Expanded List of Courses*:

- ESE 501 Networking—Theory and Fundamentals
- ESE 514 Physics of Materials I
- ESE 517 Optical Imaging
- ESE 519 Real-Time and Embedded Systems
- ESE 529 RF MEMS
- ESE 575 Wireless Sensor Networks
- 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) Technical Elective:
   One course unit from any graduate offerings in ESE, CIS, MEAM, TCOM, CIT, EAS**, or ENM.

D. Three (3) Other Electives:
   Three course units from the graduate courses offered in SEAS, SAS***, or Wharton

NOTES:
* Courses cross-listed with ESE courses to be applied under Part A or B must be taken as the ESE section number.
** Only the following EAS courses are allowed: EAS 504, 510, 545 and 546.
*** SAS course(s) need advisor and graduate group chair approval. They should have technical/scientific content and relevance to the student’s program.

1. Thesis Option: Students who would like to complete a thesis may take two (2) units of Thesis Research (ESE 597)
2. A maximum of two CIT courses are allowed for the MSE in EE degree
3. A maximum of one course unit of Independent Study (ESE 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 degree.
5. 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.
6. Full time Master’s degree students normally register for three courses per semester. Full-time status requires at least three courses per semester.
7. Students are required to maintain a 2.7 GPA to remain in good academic standing. A minimum GPA of 2.7 is required for graduation.
8. Disallowed courses for any graduate degree in SEAS: A reminder that no undergraduate level courses, including those in SEAS, may be taken for a graduate degree requirement. 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.
9. For further regulations, see the ESE Graduate Student Handbook: http://www.ese.upenn.edu/grad/mse.html