# SYSTEMS ENGINEERING
# PROGRAM REQUIREMENTS (EFFECTIVE FALL 2014)

## M.S.E. in Systems Engineering Requirements (for students starting Fall 2014 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. **Three (3) Required Courses**
      B. **Three (3) Area Electives from the Approved List of Courses**
      C. **One (1) Technical Elective**
      D. **Three (3) Other Electives**

## A. Three (3) Required Courses:

ESE 504  Introduction to Optimization Theory
ESE 540  Engineering Economics
ESE 603  Simulation Modeling and Analysis

## B. Three (3) Area Electives from the Approved List of Courses*:

ENM 503  Probability (Strongly recommended if a student has not had an undergraduate course in probability)
ESE 500  Linear Systems Theory
ESE 502  Introduction to Spatial Analysis
ESE 505  Control of Systems
ESE 507  Introduction to Networks and Protocols
ESE 512 Dynamical Systems for Engineering and Biological Applications
ESE 544  Project Management
ESE 548 Transportation Planning Methods
ESE 550 Advanced Transportation Seminar
ESE 560  Sustainable Development of Water Resource Systems
ESE 567  Risk Analysis and Environmental Management
ESE 590  Systems Methodology
ESE 601  Hybrid Systems
ESE 605  Modern Convex Optimization
ESE 617  Non-Linear Control Theory
ESE 632  Random Process Models and Optimum Filtering
ESE 650 Learning in Robotics
ESE 680  Special Topics in ESE
ESE 597  Thesis Research (up to 2 course units for thesis option)
ESE 599  Independent Study (up to 1 course unit allowed towards degree)

## C. One (1) Technical Elective:

One course unit from the graduate offerings within **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:

**  **Only the following EAS courses are allowed:  EAS 504, 510, 545, 546 and 595.**

***  **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 <u>two (2) units of Thesis Research</u> (ESE 597)
2. A maximum of <u>two CIT courses</u> are allowed for the MSE in SE degree
3. A maximum of <u>one course unit of Independent Study</u> (ESE 599) is allowed
4. A maximum of <u>two graduate-level course units may be transferred</u> from another school to apply toward the MSE degree. These two courses should not have been used in fulfillment of an undergraduate degree.
5. Full time Master's degree students normally register for three courses per semester.  Full-time status requires at least three courses per semester.
6. 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.
7. <u>Disallowed courses for any graduate degree in SEAS</u>: 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.
8. For further regulations, see the **ESE Graduate Student Handbook: http://www.ese.upenn.edu/grad/mse.html**

**UNIVERSITY OF PENNSYLVANIA**
**ELECTRICAL & SYSTEMS ENGINEERING DEPARTMENT**
**SCHOOL OF ENGINEERING & APPLIED SCIENCE**

**PLEASE FILL OUT IN INK PEN**

Name _____ Advisor's Name: _____
E-mail Address_____ Telephone Number: _____

Graduate status (Circle One):        Full-time            Part-time
Your expected graduation date (mo./yr.): _____ , _____

*Note: For a Masters Degree in ESE, 10 course units are required ( No more than 1 independent study). Always check with your academic advisor if you have questions or to discuss any changes in your curriculum. For a list of available courses in ESE, check the current course timetable).*

**Please list your courses (PRINT)**

| **Three (3) Courses of Required Core** | **Semester/Year** |
| --- | --- |
| ESE 504- Introduction to Optimization Theory | _____ |
| ESE 540- Engineering Economics | _____ |
| ESE 603-Simulation Modeling and Analysis | _____ |

**Three (3) additional courses from approved ESE course list**

| | |
| --- | --- |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

**One (1) SEAS course**

| | |
| --- | --- |
| _____ | _____ |

**Three (3) Electives (SEAS, SAS or Wharton)**

| | |
| --- | --- |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

**[THIS IS A WORKSHEET ONLY FOR PLANNING PURPOSES]**
**Updated 03/28/2014**