

SYSTEMS ENGINEERING CONCENTRATION

Systems Engineering is an interdisciplinary approach and means to enable the realization of successful systems. It focuses on defining customer needs and required functionality early in the development cycle, documenting requirements, proceeding with design synthesis and system validation while considering the complete problem that includes – operations, cost & schedule, performance, training & support, test, disposal, and manufacturing. Systems Engineering integrates all the disciplines and specialty groups into a team effort forming a structured development process that proceeds from concept to production to operation. Systems Engineering considers both the business and the technical needs of all customers with the goal of providing a quality product that meets the user needs. In addition, Systems Engineering incorporates concepts of “balanced design” – achieving a product design that meets requirements but does not exceed them, and does so within the constraints of cost, schedule & performance, including life cycle costs; and “risk assessment & management” – understanding the technical and other risks that may be involved and managing the design to effectively mitigate the risks.

Required courses (5 courses, 13 credits)

- ECE 09.421 Introduction to Systems Engineering – 3-credits
- MKT 09.375 Business Logistics – 3-credits
- CS 06.390 Introduction to Systems Simulation and Modeling*– 3-credits

Plus, any two of the following –

- ENGR 01.301 Junior Engineering Clinic I – 2-credits
- ENGR 01.302 Junior Engineering Clinic II – 2-credits
- ENGR 01.401 Senior Engineering Clinic I – 2-credits
- ENGR 01.402 Senior Engineering Clinic II – 2-credits

TOTAL Required course credits – 13-credits

Elective courses (take any two, 3-credits each)

- ECE 09.321 Systems & Control
- ECE 09.433 Electrical Communications Systems
- ECE 09.402 Topics in ECE: Technology Focus Elective**
- ECE 09.4xx Approved ECE Elective***
- CS 07.340 Design and Analysis of Algorithms
- CS 07.321 Software Engineering I
- CS 04.380 Object Oriented Design
- ME 10. 342 Quality & Reliability in Design and Manufacture
- ME 10.343 Mechanical System Dynamics and Control

Elective courses (cont.)

- CE 08.305 Civil Engineering Systems
- CHE 06.405 Process Dynamics and Control
- EM 01.511 Strategic Risk Management
- EM 01.512 Quality in Engineering Management
- EM 01.513 Engineering Decision Making
- MGT 06.677 Management Skills for Engineers
- ENGR 01411 Introduction to Engineering Optimization
(Additional elective courses will be added to the concentration)

TOTAL Elective course credits – 6 credits

TOTAL credits in the Systems Engineering Concentration – 19 credits

* **CS 06.390 Introduction to Systems Simulation and Modeling** is an elective class offered by the Computer Science department only during semesters when there is sufficient demand. Therefore, the class may not be available during your last semester, if you have not made any arrangements ahead of time. Please inform ECE Department Head no later than your Fall of Junior year that you are interested in this class, so that timely arrangements can be made.

** **ECE 09.402 Topics in ECE** is a special topics class, with a different course content presented each time it is offered. Therefore, check with ECE Department Head to verify that the specific ECE 09.402 you are interested will qualify as a Systems Engineering elective.

*** **ECE 09.4XX** ECE Department regularly offers senior electives on topics that are very relevant to Systems Engineering. Please check with ECE Department Chair for approved 400-level courses that can be used as a Systems Engineering elective.