Systems Engineering Graduate Certificate Program

About the Program

Clemson University’s College of Engineering and Science is pleased to offer a new multidisciplinary certificate program in Systems Engineering. Systems Engineers manage large and/or complex projects that are comprised of multiple technical disciplines. They see the “big picture” and coordinate all aspects of projects throughout their lifecycle from inception, to development, to commissioning and project completion. Systems Engineers must be technically astute, but must understand project management, logistics, and business aspects. *Money Magazine* ranked Systems Engineering as the #1 Best Job in America in its 2009 issue. *Money* predicts the growth of Systems Engineering jobs to be 45% through 2016.

To accommodate the demanding schedules of full-time professionals, all classes are offered online through asynchronous, web-based delivery on a laptop or other mobile device for convenient viewing. Students can access courses from anywhere in the world that internet access is available. Additionally, a classroom facility at SRC in Charleston will be available to facilitate face-to-face interaction among students and the instructors.

Credits earned in this program can be applied toward graduate degree programs at Clemson University. Thus students wishing to continue their graduate studies either in Systems Engineering or a related field, can jumpstart their progress toward these studies by enrolling in this certificate program.

Program Details

The Systems Engineering Graduate Certificate Program will provide practicing engineers and scientists (from a variety of disciplinary backgrounds) with an educational program covering the fundamentals of systems engineering. This certificate program will consist of four, three-credit hour courses (12 credits total). The certificate will require two systems engineering core courses and two specialization courses chosen from tracks.

Initially two tracks will be offered: (i) *Software Intensive Systems* and (ii) *Manufacturing and Service Enterprise Systems*. Additional tracks and courses are anticipated to be developed during 2010-2011 as the program evolves, based on constituent needs.

The program begins on September 8, 2010 with the core courses. The core courses will be offered both fall and spring semesters, beginning with SYSE 802. They may be taken in any sequence. For registration assistance, please contact Dr. Randy Collins at 864-656-4440 or collins@clemson.edu.
The core systems courses will expose students to the basics of systems engineering, including:

- the origin and evolution of systems engineering
- standards
- system life cycles
- the systems engineering process
- technical and risk management
- organizational practices; requirements definition process
- functional analysis/allocation
- system architecture synthesis
- systems engineering analyses
- integration, verification, and validation
- human systems engineering
- methods for functional analysis and allocation with key supporting methodologies
- decision analysis techniques for risk management

Additionally, students will learn about project management and specific systems-oriented technical knowledge in their chosen track.

Courses

- **Foundation Courses (not part of the certificate program but available if desired by the student for prerequisites or interest):**
  - MTHSC 634: Advanced Engineering Mathematics
  - MTHSC 805: Data Analysis

- **Systems Engineering Core Courses (both are required):**
  - SYSE 801: Systems Engineering I
  - SYSE 802: Systems Engineering II

- **Track Courses (take two courses from one track):**

  **Track 1: Software Intensive Systems**
  - CpSC 871: Foundations of Software Engineering
  - CpSC 872: Software Specifications and Design Techniques

  **Track 2: Manufacturing and Service Enterprise Systems**
  - IE 851: Data Collection, Analysis and Interpretation
  - IE 852: Modeling and Decision Making
  - IE 853: Foundations of Quality
  - IE 854: Fundamentals of Supply Chain and Logistics
  - IE 857: Health, Safety and the Environment
  - ME 617: Mechatronics System Design
  - ME 818: Introduction to Finite Element Analysis
  - ME 819: Computational Methods in Thermal Sciences
  - ME 871: Engineering Optimization
Systems Engineering Graduate Certificate Core Courses

**SYSE 801: Systems Engineering I**  
(Begins Spring 2011)

**Instructor:** Dr. Anand Gramopadhye  
Professor, Department of Industrial Engineering  
agramop@clemson.edu

**Topical Outline:**

- ANSI/EIA-632 Standards
- ISO 15288
- Mapping the systems engineering process onto system life cycles
- Systems engineering process
- Systems engineering technical management
- Risk management
- Organizational practices
- Decision analysis technique for risk management

**SYSE 802: Systems Engineering II**  
(Begins September 8, 2010)

**Instructor:** Dr. John McGregor  
Associate Professor, School of Computing  
johnmc@cs.clemson.edu

**Topical Outline:**

- Requirements definition process
- Functional analysis/allocation
- System architecture synthesis
- Systems engineering analyses
- Integration, verification, and validation
- Human systems engineering
- Methods for functional analysis and allocation with key supporting methodologies
How to Register

1. Go to [www.grad.clemson.edu](http://www.grad.clemson.edu).
2. Select the “Apply Online” (orange button).
3. Read “Non-Degree Seeking” information.
4. Select “Create Your Account” under “Getting Started”.
5. Create an account.
6. Go to [www.grad.clemson.edu/admission/application.php](http://www.grad.clemson.edu/admission/application.php). This is also accessible by clicking on “Apply Now” (purple with orange flame) button at: [www.grad.clemson.edu/Admission.php](http://www.grad.clemson.edu/Admission.php)
7. Complete Application.
9. Then, under “Specialty Area”, select “None of the Above” from the drop down menu.
10. Complete and submit the application.
11. Once you are accepted, they will be sent a letter containing userid and password. Initially, your password is the last four digits of their SSN number. The link to the web registration site (TigerWeb) is [http://tigerweb.clemson.edu/](http://tigerweb.clemson.edu/)
12. Register for the course SYSE 802.
13. Go to the SISweb within TigerWeb to pay tuition [http://tigerweb.clemson.edu/](http://tigerweb.clemson.edu/). Click on “My University Bill”.