Stevens Institute of Technology

Introduction to Systems Engineering SYS 581

Meeting Times: Mondays, 3:00 – 5:30pm
Classroom Location: Edwin Stevens 230
Instructor: Onur Asan
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Phone: (201) 216-3616
Email: oasan@stevens.edu
Office Hours: Wednesdays 1:00 – 2:00 pm (or Anytime by appointment)
Prerequisite(s): None

Course Teaching Assistant:
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Course Description: The growing complexity of today's engineered systems presents daunting challenges to those who are charged with creating, operating, enhancing and sustaining them throughout their lifecycles. While individual components of these systems require no less design effort than in the past, attention to the components alone is not sufficient to ensure overall system success. This course focuses on the interactions between the elements of a complex system, the context within which they are designed and operate, and the relationships between technical systems, the organizations that design them and the enterprises they serve. Students develop an understanding of techniques and processes required to ensure that their individual contributions are not only excellent in themselves, but that they become part of a cohesive, successful whole. Students will apply systems engineering principles and practices within a specific domain, such as media and broadcasting. This course may not be applied toward a Master's of Engineering in Systems Engineering or Engineering Management.

COURSE GOALS
The course enhances the ability of design engineers, program and project managers, and others who work with complex systems to:

• Understand the context in which systems operate, the customers they serve and the stakeholder needs they must satisfy
• Work across the boundaries between traditional engineering disciplines to ensure that a system as a whole fulfills its purpose
• Appreciate the importance of interfaces and understand how to effectively work across them
• Collaborate with others of different disciplines and backgrounds as members of a diverse team to bring effective solutions to life

COURSE OUTCOMES
After successful completion of this course, students will be able to:

Define an operational need and distinguish between the need and its solution (ABET Outcome c)

Elicit a comprehensive set of stakeholder requirements and translate them into specifications that can be used to drive detailed design (ABET Outcome c)

Develop a system architecture and flow system requirements down to individual components that can then be designed or procured (ABET Outcome c)

Develop integration and test plans to ensure that the system satisfies its requirements at every level and meets the needs of all its stakeholders (ABET Outcome b)

Apply systems engineering principles and practices within a specific domain, such as media and broadcasting, sustainable energy, healthcare and medicine, financial systems or security and defense. (ABET Outcome d)

Understand emerging trends in system complexity and evolving systems engineering approaches for dealing with them. (ABET Outcome i)

COURSE MATERIALS

Systems Engineering Handbook, NASA (Optional)

GRADING PROCEDURES
Attendance 10% (Including coming to the class and participating actively to class activities)
Homework (In class+ home+ discussion board) 20%
Midterm Exam 20%
Class Project related activities 50%
- Concept Review 10%
- Design Review 10%
- Test Readiness Review 10%
- Final Project Report 20%

Final Points Percent Grade

Grade	Points
A	>92
A-	90 -92
B+	87-90
B	83-86.9
B-	80-82.9
C+	77-78.9
C	73-76.9

C-	70-72.9
D+	67-69
D-	60-66
F	<60

*Note: Graduate students are not eligible to receive a grade of C-, D+, or D and will instead receive a grade of F.

COURSE PROJECT DESCRIPTION

Students will be expected to participate in a semester long, team-based course project focused on their domain of interest. Through their project they will demonstrate systems thinking by extracting the salient points from their project and applying the tenants of systems engineering covered throughout the course.

Course Schedule

Week	Topic	HW	Project
1) January 23th	Thinking in Terms of Systems	**All HWs will be assigned weekly TBD**	Domain Project - topic selection
Deciding What Build and Why			
2) January 30st	Defining the Problem		
3) February 6th	Developing a Solution		
4) February 13th	Formulating a Proposal		Domain Project - Concept Preparation
5) February 20st	**Concept Review**		
Bringing Solutions to Life	**Bringing Solutions to Life**	**Bringing Solutions to Life**	**Bringing Solutions to Life**
6) February 27st	**Guest Lecturer**		
7) March 6th	Building a Functional Model Implementing the Functions		
8) March 13th	Spring break	Spring break	Spring break
9) March 20st	Specifying Components		Domain Project - Design Review Preparation
10) March 27h	**Design Review**		
Ensuring the System Works and is Robust and Managing Evolution			
11) April 3th	Integration and Test		

12) April 10th	Modeling and Simulation		
13) April 17th	**Midterm Exam**	**Midterm Exam**	**Midterm Exam**
14) April 24th	Designing for the Lifecycle and Managing Evolution		Domain Project - Test Readiness Review Preparation
15) May 1nd	**Test Readiness Review**		
16) May 9th	**Final Project Report Submission**		