Syllabus SYS 625

SYS625: Fundamentals of Systems Engineering

School of Systems and Enterprises

For Instructor, Contact Info, Office Hours: See Faculty Profile

Prerequisite(s): None

Cross-listed with: CPE625

COURSE DESCRIPTION

The Fundamentals of Systems Engineering course introduces students to the principles and processes of systems engineering. The course enables them to more effectively design solutions that meet stakeholder needs. The course centers on a group project that students pursue in small, remote teams. Fundamentals of Systems Engineering provides students with a disciplined approach for identifying a customer or stakeholder need and translating that need into a complete set of requirements or specifications for a system that meets the need. The focus is on developing an outside-in view that treats the system as a black box, without regard to the components from which it will be built. The course emphasizes the distinction between an operational need and a system solution, and stresses the importance of understanding the customer need before jumping to a solution. The intent is not just to describe the systems engineering and architecting process. Rather, the course helps students understand how to think through the choices at each step of the process. What decisions have to be made? What factors should be considered in making them? It is the answers to these questions that make for good systems engineering, not just adherence to a standard process. The primary objective of this course is to achieve a strong foundation in systems engineering principles and processes.

LEARNING OBJECTIVES

After taking this course, the student will be able to:

- Understand the need for good systems engineering up front and throughout the life cycle of the system.
- Review and evaluate the various systems engineering models in use today.
- Differentiate between the operational need and the system solution to be implemented.
- Select from a wide range of system concepts as the first step in system design.
- Derive quantitative system requirements that best meet the functions and performance requirements of the system.
- Adopt a systems perspective when making decisions that affect performance or total ownership cost of the system.

FORMAT AND STRUCTURE

The course will employ weekly lectures (students are required to listen), supplemental reading and additional resources, quizzes, weekly online discussion, term papers, weekly team assignments and a final team project. Students are required to meet with their teams at least twice weekly.

Course Outline

The course is divided into thirteen modules that are completed over the same number of weeks. Students are required to complete one team assignment each week. Students are required to participate in an online discussion of the current week's work. The weekly team assignment builds to a final report on the team project in the form of an abbreviated Systems Requirement Review (SRR) in lieu of a final exam. To promote full team member participation, students are required to assess their own contributions and those of other members of their team part-way through the semester and again at the end of the semester, prior to the grading of the final team project. These assessments can affect an individual's grade on the final project.

COURSE MATERIALS

Required Text(s) - purchased ahead of class

•**Applied Space Systems Engineering (Space Technology Series**) by Wiley Larson, Doug Kilpatrick, et al (Learning Solutions, 2009)

•**The Innovator's Dilemma** by Clayton M. Christensen (Harvard Business Review, reprint Jan 5,

2016 edition only) Readily available in paperback from online booksellers (e.g. Amazon), or as an e-book.

Required Readings

Required Readings may be assigned for each week and will be found in the course website.

Required Equipment

Every student must have a working (external) microphone and headset for their course-computer or full participation in the team meetings and any live sessions.

COURSE REQUIREMENTS

In order to successfully complete the course, each student must:

1. Complete/update a ***student profile*** at the beginning of the course.
2. Ensure that team ***assignments*** are ***posted on time*** to the correct discussion group when serving as team leader.
3. Participate in the online discussion ***for each week.***
4. Complete ***individual assignments***, as assigned (Assignments section).
5. Contribute weekly to the ***team project*** as assessed by other members of the team. Submit team project deliverables on time.
6. Read business book and prepare ***one term paper*** and post to Turnitin.
7. Complete the ***online course survey*** at the end of the course.

GRADING PROCEDURES

GRADED EVENTS	% of Course*
Individual class participation (discussions, team assessments)	30-40%
Individual term paper(s), weekly team assignments, quizzes	20-30%

Team project/presentation	30-40%
TOTAL	**100%**

Please note that assignments and papers in this class will be submitted to **www.turnitin.com (http://www.turnitin.com/)** , a web-based anti-plagiarism system, for an evaluation of their originality.

Projects and homework are scheduled for submission on the dates shown in the course Calendar. *Prior approval must be received for late assignments, and may affect the earned points.*

*Check the course gradebook for the specific breakdown

Grading Criteria - Final Grade

(1) Turn in all written material on time (see weekly assignments on the course website).

(2) Points earned are rounded down.

(3) Final grades will be awarded in accordance with the following scale:

Grade	Percentage/Points
A	93-100
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79

C	73 – 76
C-	70-72
F	<70

ACADEMIC INTEGRITY

Graduate Student Code of Academic Integrity

All Stevens graduate students promise to be fully truthful and avoid dishonesty, fraud, misrepresentation, and deceit of any type in relation to their academic work. A student's submission of work for academic credit indicates that the work is the student's own. All outside assistance must be acknowledged. Any student who violates this code or who knowingly assists another student in violating this code shall be subject to discipline.

All graduate students are bound to the Graduate Student Code of Academic Integrity by enrollment in graduate coursework at Stevens. It is the responsibility of each graduate student to understand and adhere to the Graduate Student Code of Academic Integrity. More information including types of violations, the process for handling perceived violations, and types of sanctions can be found at **www.stevens.edu/provost/graduate-academics (http://www.stevens.edu/provost/graduate-academics)** .

EXAM ROOM CONDITIONS

The following procedures apply to quizzes and exams for this course. As the instructor, I reserve the right to modify any conditions set forth below by printing revised Exam Room Conditions on the quiz or exam.

1. Students may use the following devices during quizzes and/or Any electronic devices that are not mentioned in the list below are not permitted.

	Permitted?	
Device		
	Yes	No
Laptops	X	

Cell Phones		X
Tablets	X	
Smart Watches		X
Google Glass		X
Other		X

2. Students may use the following materials during quizzes and/or Any materials that are not mentioned in the list below are <u>not</u> permitted.

Material	**Permitted?** Yes	No
Handwritten Notes *Conditions*: Only your own notes may be used	X	
Typed Notes *Conditions*:Only your own notes may be used	X	
Textbooks *Conditions*:Only your own notes may be used	X	
Readings *Conditions*: Any readings assigned in the course	X	
Other (specify) - no other materials allowed		X

3. Students are/are not allowed to work with or talk to other students during quizzes and/or exams.

Specific Parameters: No chat or texting.

LEARNING ACCOMMODATIONS

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. Student Counseling and Disability Services works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, and psychiatric disorders in order to help students achieve their academic and personal potential. They facilitate equal access to the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage independence and self-advocacy with support from SCDS staff. The SCDS staff will facilitate the provision of accommodations on a case-by-case basis. These academic accommodations are provided at no cost to the student.

Disability Services Confidentiality Policy

Student Disability Files are kept separate from academic files and are stored in a secure location within the office of Student Counseling, Psychological & Disability Services. The Family Educational Rights Privacy Act (FERPA, 20 U.S.C. 1232g; 34CFR, Part 99) regulates disclosure of disability documentation and records maintained by Stevens Disability Services. According to this act, prior written consent by the student is required before our Disability Services office may release disability documentation or records to anyone. An exception is made in unusual circumstances, such as the case of health and safety emergencies.

For more information about Disability Services and the process to receive accommodations, visit **https://www.stevens.edu/sit/counseling/disability-services (https://www.stevens.edu/sit/counseling/disability-services)** . If you have any questions please contact:

Lauren Poleyeff, Psy.M., LCSW - Diability Services Coordinator and Staff Clinician in Student Counseling and Disability Services at Stevens Institute of Technology at **lpoleyef@stevens.edu (mailto:lpoleyef@stevens.edu)** or by phone **(201) 216-8728.**

INCLUSIVITY STATEMENT

Stevens Institute of Technology believes that diversity and inclusiveness are essential to excellence in education and innovation. Our community represents a rich variety of backgrounds, experiences, demographics and perspectives and Stevens is committed to fostering a learning environment where every individual is respected and engaged. To facilitate a dynamic and inclusive educational experience, we ask all members of the community to:

- be open to the perspectives of others
- appreciate the uniqueness their colleagues
- take advantage of the opportunity to learn from each other
- exchange experiences, values and beliefs
- communicate in a respectful manner
- be aware of individuals who are marginalized and involve them
- keep confidential discussions private

TENTATIVE COURSE SCHEDULE: See separate schedule posted in the Orientation Week Module 0