SIE 454A/554A: The Systems Engineering Process
Fall 2018
M&W 3-4:15
AME S212

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Grader: TBD
Office: N/A
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Prerequisite: Advanced standing in the College of Engineering; or
SIE 250 Introduction to Systems and Industrial Engineering

Course Description
Processes and tools for engineering large-scale, complex systems: architecture, requirements, risk management, evaluation criteria, concept exploration, decision making, tradeoff studies, life-cycle models, decomposition, system coupling, test, verification, validation, system modeling, business process re-engineering, sensitivity analysis, teamwork, process maturity and documentation.

Course Objectives
This course is aimed at developing your capability of systems thinking by introducing classical and advanced systems engineering theory, methods, and tools. After taking this course, you should be able to:

- Apply systems engineering methodologies & tools to the design of large, complex systems from eliciting customer requirements through disposal
- Apply systems engineering methodologies & tools to a project
- Judge the applicability of any proposed process, strategy, or methodology for systems engineering using the fundamental concepts from disciplines such as probability, economics, and cognitive science
- Understand system engineers' role and responsibilities within organizations
- Understand the dynamics of teams and their role in successful projects

- Recognize the value and limitations of modeling and simulation
- Communicate effectively with team members through both oral and written means

Required Course Texts

1. Readings based on "Blanchard, B. S. and Fabrycky, W. J., *Systems Engineering and Analysis* (5th Edition), Prentice Hall, 2010." **Note: do not purchase the complete book, a custom course reader has been created with selected chapters from the book**. It can be purchased at the UA Bookstore or via http://uabookstores.arizona.edu/. It will be identified as SIE 454A/554A Systems Engineering University of Arizona, Pearson Custom Library (ISBN 9781269818445)

Supplemental Resources

Air Force Institute of Technology Systems Engineering Case Studies
http://www.afit.edu/cs/cases.cfm
INCOSE Systems Engineering Handbook
NASA Systems Engineering Handbook
https://www.nasa.gov/sites/default/files/atoms/files/nasa_systems_engineering_handbook.pdf

Homework assignments

There are ten homework assignments, you are responsible for completing all of them. The ten homework assignments are worth 20% of your grade. Assignments must be 2-3 pages in length (single spaced) and must be submitted electronically via the D2L website before each class meeting. Penalties will be applied for late submissions.

Midterm Exam

A take-home exam will be administered approximately two-thirds of the way through the semester to assess progress on learning objectives. Rather than testing memorization, the focus will be on the application of concepts from the first half of the class.

Final Project

The best way to learn systems engineering is to apply it to a real situation. You will be expected to find an existing effort where you can apply one or more concepts learned in the class. Deliverables include a System Concept of Operations, System Detail Design, and final project report. Scope of the proposed project will be set on a case by case basis. Arrangements may be made for team projects but the content will be commensurate with expected person-effort.

Basis of grade

Component	Weight	Notes
Homework	20%	10 assignments @ 2% each
Midterm	40%	Due 10 October
Final project	40%*	Due 7 December

*Final project grade is comprised of ConOps (5%) + Detail Design (5%) + Final written report (30%).

Accessibility and Accommodations
Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations. For additional information on Disability Resources and reasonable accommodations, please visit http://drc.arizona.edu/.

If you have reasonable accommodations, please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate.

Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Inclusive Excellence is a fundamental part of the University of Arizona's strategic plan and culture. As part of this initiative, the institution embraces and practices diversity and inclusiveness. These values are expected, respected and welcomed in this course.

Threatening Behavior Policy
The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to one's self. See: http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students.

Code of Academic Integrity
Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity

The University Libraries have some excellent tips for avoiding plagiarism available at: http://www.library.arizona.edu/help/tutorials/plagiarism/index.html

Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA email to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student email addresses. This conduct may also constitute copyright infringement.

UA Nondiscrimination and Anti-harassment Policy
The University is committed to creating and maintaining an environment free of discrimination, http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

Subject to Change Statement
Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor

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