SIE 250 Introduction to Systems and Industrial Engineering
Fall 2025 – Systems Engineering Section
Syllabus

Class Location and Times:
Classroom: R P Harvill Bldg, Rm 102.
Times: MoWeFr 11-11:50am
Aug 25 – Dec 10, 2025

Description of Course
This course introduces students to the discipline of systems engineering. Students will engage in different lectures and hands-on activities to (1) experience the need for systems engineering within an engineering endeavor, (2) learn about the different concepts, methods, and processes that systems engineers can use to support an engineering endeavor, and (3) apply some of them to a realistic engineering project.

Course Objectives:
The purpose of this course is to introduce students to the discipline of systems engineering.

Expected Learning Outcomes:
Having successfully completed this course, the student will be able to:
1. Explain what systems engineering is.
2. Explain why systems engineering is important.
3. Explain the role that systems engineering plays within an engineering effort.
4. Explain what a systems engineer does.
5. Describe the fundamental concepts, methods, and processes that form the systems engineering discipline.

Course Prerequisites or Co-requisites
Pre-requisite: Majoring in Systems Engineering.

Instructor and Contact Information
Instructor: Dr. Joe Gregory
Office: ENG 1.60
Phone: 520.279.4572
Email Address: joegregory@arizona.edu
Home Page: no UA page, LinkedIn: https://www.linkedin.com/in/joe-gregory-phd/
Office Hours: By appointment.

Course Text
There are two required textbooks in this course:
1) Systems Engineering Handbook: A Guide for System Life Cycle Processes and Activities, Fifth Edition. The International Council on Systems Engineering (INCOSE). Note: Since the University of Arizona is a Corporative Advisory Board

SIE 250 Introduction to Systems and Industrial Engineering
Fall 2025 – Systems Engineering Section
Syllabus

(CAB) member of INCOSE, you will be able to freely access a digital version of this book. How to access it will be explained in D2L.

2) The Systems Engineering Body of Knowledge (SEBoK). https://sebokwiki.org.

Course Software

Students will use different software tools during the course. These include:

- The UofA Digital Engineering Factory (DEF).
- LEGO Digital Designer.
- LEGO Mindstorms Ev3 Programming environment.

The different software tools will be provided to students during the course.

Course Format and Teaching Methods

All course information is located on the course homepage, which is in Desire2Learn (D2L) at **https://d2l.arizona.edu/**. **NOTE:** The course site includes information about the course structure, dynamics, and grading beyond that reported in this syllabus. All students must review such information in advance of class.

A schedule of the different activities during the semester will be posted in D2L.

In addition to all policies and information in this document, the instructor expects of every student in this course the following:

- Be aware of all assignment due dates, including reading assignments, and read assigned materials.
- To participate in class discussions.
- To manage the learning process – seek clarification and feedback if needed.
- To complete assignments on time and in a professional manner.
- To demonstrate courtesy and respect to peers and instructor.

Grading Scale and Policies:

The grading scheme for this course is based on showing mastery of learning objectives. The learning objectives are listed below:

LO1. The student is able to explain what systems engineering is, which includes adequately describing:

LO1.1 Fundamental concepts of systems theory and systems science.
LO1.2 Fundamental concepts of systems thinking.
LO1.3 Foundations of systems engineering.
LO1.4 Lifecycle and lifecycle models.
LO1.5 Taxonomies of kinds of systems.

LO2. Explain why systems engineering is important, which includes adequately

explaining why:

LO2.1 The rise in system complexity gave birth to systems engineering.

LO2.2 The development of systems should be driven by stakeholder needs.

LO2.3 Technical, business, and programmatic concerns must be addressed at once to facilitate development success.

LO2.4 Problem definition is important.

LO2.5 System architecture and design are important.

LO2.6 Interface design and control is important.

LO2.7 Anticipating system integration is important.

LO2.8 Anticipating and executing system verification is important.

LO2.9 Anticipating and executing System validation is important.

LO2.10 Anticipating system transition, operation, sustainment, and retirement is important.

LO3. Explain the role that systems engineering plays within an engineering effort, which includes:

LO3.1 Describing the relationship between systems engineering and other engineering disciplines.

LO.2 Describing the relationship between systems engineering and other non-engineering disciplines.

LO3.3 Listing the different life cycle processes of concern for systems engineering.

LO3.4 Explaining the role of decision management within an engineering effort.

LO3.5 Explaining the role of risk and opportunity management within an engineering effort.

LO3.6 Explaining the role of planning, monitoring, and control within an engineering effort.

LO3.7 Explaining the role of configuration and information control within an engineering effort.

LO3.8 Explaining the role of modeling and analysis within an engineering effort.

LO4. Explain what a systems engineer does, which includes the mapping of LO3's to the tasks of the individual systems engineer within a team.

LO5. Describe the fundamental concepts, methods, and processes that form the systems engineering discipline, which includes adequately describing concepts, methods, and processes for:

LO5.1 Problem definition.

LO5.2 System architecture and design.

LO5.3 Interfaces.

LO5.4 System integration.

LO5.5 System verification.

LO5.6 System validation.

LO5.7 System transition, operation, sustainment, and retirement.

3

SIE 250 Introduction to Systems and Industrial Engineering
Fall 2025 – Systems Engineering Section
Syllabus

Specifically, these learning objectives will be assessed throughout the semester using different instruments:

- A personal journal that the students will develop during the course, reflecting upon their experiences of working on an engineering project within the course.

The attainment of learning objectives will be mapped to letter grades for the course in an incremental manner, as follows:

Grade	Description	Standard
E	failure	One or more LO1s or LO2s are not met. *The student is not able to explain what systems engineering is and why it is important.*
D	poor	At least all LO1s and LO2s have been demonstrated. *The student is able to explain what systems engineering is and why it is important.*
C	satisfactory	At least all LO1s, LO2s, LO3s, and LO4s have been demonstrated. *The student is able to explain what systems engineering is, why systems engineering is important, what role systems engineering plays within an engineering effort, and what the systems engineer does in an engineering team.*
B	good	At least all LO1s, LO2s, LO3s, LO4s, and half of LO5s have been demonstrated. *The student is able to explain what systems engineering is, why systems engineering is important, what role systems engineering plays within an engineering effort, and what the systems engineer does in an engineering team. In addition, the student is able to describe the underlying concepts, methods, and processes for some specific systems engineering activities.*
A	excellent	All LO1s, LO2s, LO3s, LO4s, and LO5s have been demonstrated. *The student is able to explain what systems engineering is, why systems engineering is important, what role systems engineering plays within an engineering effort, and what the systems engineer does in an engineering team. In addition, the student is able to describe the underlying concepts, methods, and processes for the main systems engineering activities.*

SIE 250 Introduction to Systems and Industrial Engineering
Fall 2025 – Systems Engineering Section
Syllabus

There is no final exam in this course.

If a student believes there are errors in the grading, they should be reported in written to the instructor within 10 days of receiving the graded assignment.

Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available at http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete and http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal respectively.

Dispute of Grade Policy: Provide within the acceptable time period for disputing a grade on a paper, project, or exam.

University policy regarding grades and grading systems is available at: http://catalog.arizona.edu/policy/grades-and-grading-system

Lecture schedule

The lecture schedule is provided in D2L.

Participation

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: **http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop**. The UArizona policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, see: **http://policy.arizona.edu/human-resources/religious-accommodation-policy**. Absences pre-approved by the UArizona Dean of Students (or Dean Designee) will be honored. See: **http://policy.arizona.edu/employmenthuman-resources/attendance**.

Classroom Behavior Policy:

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

Mainly from the university classroom policy (adopted by the Faculty Senate):
- Not leaving early. Early leaving will distract both the instructor and students
- Not talking with other classmates while the instructor or another student is speaking. If a student has a question or comment, he or she should raise a hand, rather than starting a conversation about it with a neighbor
- Not packing backpacks to leave until the instructor has dismissed class
- Showing respect and concern for others by not monopolizing class discussion.

SIE 250 Introduction to Systems and Industrial Engineering
Fall 2025 – Systems Engineering Section
Syllabus

Students must allow others time to give their input and ask questions. Students should not stray from the topic of class discussion

- Not eating and drinking during class time

Academic Integrity and 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/policies/code-academic-integrity. The University Libraries have some excellent tips for avoiding plagiarism, available at http://new.library.arizona.edu/research/citing/plagiarism.

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 e-mail to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student e-mail addresses. This conduct may also constitute copyright infringement. Instructor and/or TA will carefully exam all of your homework, reports and exams to prevent plagiarism. For example:

- No copying of other people's homework. In grading your homework, TA will examine all of your homework carefully and catch anyone who is copying other people's homework. Even if they are from the same software's output, TA can still judge whether it is a copy of others or not based on your writing and formatting.

Teaching Assistant's Responsibility

TA is mainly responsible for assisting the instructor in various issues, including grading homework/quizzes/exams, teaching part of software and tutorial, and helping students in programming and homework during the office hour.

Send Feedback to US:

If you have any questions, suggestions or comments related to the class, you are very welcome to contact the instructor or TA. We have several ways for communications:
1) In-class feedback
2) Office hours
3) Emails
4) Individual appointment (if you cannot come in office hour)
5) Feedback in D2L

Threatening Behavior Policy:

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to

any member of the University community, including to oneself. See:
https://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students

UArizona Nondiscrimination and Anti-harassment Policy:

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

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. This course supports elective gender pronoun use and self-identification; rosters indicating such choices will be updated throughout the semester, upon student request. As the course includes group work and in-class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect.

Additional Resources for Students Statement: Office of Diversity
http://diversity.arizona.edu/
http://www.health.arizona.edu/counseling-and-psych-services

Accessibility and Accommodations (for students with Disability)

At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, you are welcome to let me know so that we can discuss options.   You are also encouraged to contact Disability Resources (520-621-3268,   https://drc.arizona.edu/) to establish reasonable accommodations.

Use of AI

AI is Sometimes Permitted -

In this course, generative AI tools may be used for some tasks and/or assignments. You may use AI to support your research, but not to help you write your reflections. If you are in doubt as to whether you are misusing AI tools in this course or want to talk about using AI, please contact the instructor. AI support must be acknowledged/disclosed per assignment expectations so as not to violate the Code of Academic Integrity. For example: I acknowledge the use of [insert name of AI system(s)] to [describe specific use of generative artificial intelligence]. Prompts used included [share link or copy-and-paste prompt]. See UA Libraries Guide: How to Cite AI. Further information can be found at https://ucatt.arizona.edu/teaching/artificial-intelligence-teaching-learning

SIE 250 Introduction to Systems and Industrial Engineering
Fall 2025 – Systems Engineering Section
Syllabus
Requests for incomplete (I) or withdrawal (W)

Must be made in accordance with University policies, which are available at
http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete and
http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal
respectively.

Additional Resources for Students

UArizona Academic policies and procedures are available at
http://catalog.arizona.edu/policies
Student Assistance and Advocacy information is available at
http://deanofstudents.arizona.edu/student-assistance/students/student-assistance

Subject to Change Statement

The information contained in the course syllabus, may be subject to change, as
deemed appropriate by the instructor, see **http://policy.arizona.edu/faculty-affairs-and-academics/course-syllabus-policy-undergraduate-template**.