

AE 6372 - Syllabus

Aerospace Systems Engineering- 3 Credits

Instructor: Dr. Elena Garcia elena.garcia@ae.gatech.edu

Description

Introduction to aerospace systems engineering. Systems engineering and quality engineering methods and tools. Top-down design decision support processes, computer integrated environments, Integrated Product/Process Development (IPPD).

Course Goals and Learning Outcomes

Upon completion of this course students will be able to:

- Define all elements of Systems Engineering
- Follow a structured approach to systems thinking
- Identify, understand, and use Systems Engineering tools, including Model Based Systems Engineering
- Apply Systems Engineering thinking and tools, including MBSE, in the context of a complex multi-disciplinary semester long group project

Topics Covered

- Systems Engineering Definitions and Need
- Integrated Product and Process Development
- Project Scoping
- Quality Function Deployment
- Requirements Definition and Analysis
- Model Based Systems Engineering
- Morphological Analysis
- Trade studies
- Sensitivity Analysis
- Risk Identification and Management
- Design Under Uncertainty, Robust Design and Six Sigma
- Product Life-cycle Management

Course Resources

- Course Notes on Canvas
- NASA Systems Engineering Handbook <https://www.nasa.gov/reference/systems-engineering-handbook/>
- Defense Acquisition University Systems Engineering Brainbook https://content1.dau.edu/DAUMIG_se-brainbook_189/content/index.html

Communication

Canvas will be the primary mode of communication for this course. **Please make sure your Canvas is set up so that you receive announcements to your e-mail.**

You will be responsible for keeping track of all information disseminated over Canvas. The Canvas website will provide all official lecture material, important announcements, assignments and relevant information.

Please use the Canvas inbox as much as possible when e-mailing, it will help keep your e-mails from getting lost.

Course Requirements & Grading

| Component | Percent | Description |
|---------------|---------|--|
| Homework | 20% | Weekly individual assignments applying systems engineering tools |
| Participation | 15% | Weekly questions and contributions during class (in person or via zoom) or through Canvas discussion board |
| Quizzes | 30% | Weekly assessment of key systems engineering concepts |
| Team Project | 35% | Application of systems engineering thinking and tools in the context of a complex multi-disciplinary semester long group project |

Office hours

Instructor Office Hours:

Weekly during normal business hours

TA Office hours:

Weekly in the evening

Expectations of Students

Students are expected to attend class in person or via zoom or review lecture recordings online. Students are expected to participate in discussions, complete assignments, actively contribute to groups, and make every effort to understand the course material. Students are expected to show respect to the instructor and their peers.

Expectations of the Instructor

I care about you learning the course material. I will provide instructional materials for your reference. I will happily answer questions regarding the material, projects or homework. If you find yourself struggling after giving it your best effort, seek assistance. I will respect you and will do my best to provide an inclusive environment for everyone.

Other Course Policies

- No late assignments will be accepted. All assignments will have about a week available for their completion. Do not leave them until the last minute!
- Extensions may be granted in cases where extenuating circumstances prevented the student from reasonably completing an assignment on time. Examples include illness, emergencies, family situations, and institute excused absences. For simple matters, you may request these extensions before the due date (or in extraordinary circumstances as soon as feasible) by directly contacting the instructor. If you have a more complex situation or one which you wish to keep private, you should work with the Office of the Dean of Students. They can assist students with documented emergencies by contacting professors on behalf of the student. You can get more information on this process here: <https://studentlife.gatech.edu/content/class-attendance>
- I value honesty and integrity. All assignments are expected to be your own work not copied from anywhere or anyone else (including solution manuals or previous semesters) unless explicitly stated otherwise. Text or images generated by AI are NOT permitted.
- Attendance is encouraged, however, if you are ill, please do not come to class. Your health takes priority and your fellow students will thank you for not exposing them.
- If you ever find yourself in any situation in which an unexpected personal challenge is preventing you from performing your best in the course, please reach out so we can come up with a plan for you BEFORE you start missing assignments.

Honor Code Statement

Students are expected to abide by the Honor Code of the Georgia Institute of Technology. Information on the Honor Code can be found at: <https://osi.gatech.edu/content/honor-code>

Use of Generative AI Tools

Students are not allowed to create text, code or images using generative machine learning models and services in any of their graded assignments. Students are reminded that they are attending school to learn new skills and methods and they should focus on attaining them rather than looking for shortcuts that reflect badly on their work ethic. Assignments will be run through AI/plagiarism checking software.

Access and Accommodations

Your experience in this class is important to me. If you have established accommodations with the Offices of Disability Services, please communicate your approved accommodations to me at your earliest convenience so we can discuss your needs in this course.

If you have not yet established services through Disability Services, but have a temporary health condition or permanent disability that requires accommodations (conditions include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), please contact the Office of Disability Services at 404.894.2563 or dsinfo@gatech.edu or disabilityservices.gatech.edu.

Disability Services offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s) and Disability Services. It is important to the Georgia Institute of Technology and to me specifically to create inclusive and accessible learning environments consistent with federal and state law.