AE 4803 ACC Syllabus

Intro to Safety by Design, AE 4803 ACC, 3 credit hours

Fall 2026

Instructor Information

Instructor: Evan D. Harrison

Email: evan.harrison@asdl.gatech.edu

General Course Information

Description

This course explores multi-disciplinary issues in accident causation and system safety across different industries and introduces various frameworks for addressing system safety concerns within aerospace system design.

Course Learning Outcomes

This course is intended to provide additional context on air vehicle safety, reliability, and certification considerations the vehicle design process in order to better install critical aspects of safety culture among engineering students. Students will be introduced to core safety principles and the fundamental methods for incorporating safety analysis of aerospace systems alongside system design and engineering. This course is an application-oriented course aimed at introducing students to safety concepts and approaches for integrating complex aerospace system development with safety by design and flight certification processes.

To better understand the nature of system safety, students will engage with prominent accidents and incidents from across a range of industries, exposing students to the multidisciplinary issues of accident causation and system safety. Students will reinforce this understanding of system safety issues through introduction to interactive approaches for aircraft and system development and safety assessment.

The goal of the course is to provide a balance between analysis of current practices and description of cutting-edge techniques that address the shortcomings of current practices. Students participate in group projects and in-class discussions where they apply introduced

concepts, techniques, and tools to existing and newly developed aviation systems while developing safety competence and culture.

Pursuant to these goals, this course endeavors to achieve the following objectives:

1. To instill a proper safety culture among engineering students before they enter the workforce
2. To enrich the students understanding of causality (temporal depth, diversity of agency, coordinability), and in so doing, to expand the scope of accident prevention options they can conceive and consider
3. To provide the students with a solid understanding of the multi-disciplinary issues in accident causation and system safety, including:
    a. the anatomy of accidents across different industries, and their common features;
    b. fundamental failure mechanisms and causal basis of this distinctive class of adverse events;
    c. general system safety principles for accident prevention;
    d. issues in risk analysis, human factors, and safety culture.
4. To develop a familiarity with standard system safety analysis methods and techniques within the broader context of multidisciplinary design and analysis of complex systems.

Required Course Materials

No textbook is required for this course. Over the course several articles will be assigned for student reading and review as the subject of in-class discussion. Articles will either be directly provided via the course website or accessible with GT credentials.

Grading Policy:

Grades are based on participation, deliverables, updates, and presentations. The distribution of these elements are shown below.

- In-class Participation - 20%
- Individual Summary of Weekly Topics and Reading - 20%
- Team Presentation of Reading - 20%
- Team Term Paper Progress Update - 10%
- Team Term Paper Abstract - 15%
- Team Term Paper & Final Presentation 15%

Description of Graded Components

Over the course of the semester students will participate in both individual and group learning activities. At the outset students will examine a number of high-profile accidents drawn from a variety of industries in order to examine Safety by Observation. Following this study of accidents students will then be introduced to several aspects of Safety by Design, gaining insight into methods and techniques for addressing safety within future system development.

For both the Safety by Observation and Safety by Design portions of the course, students will read through the assigned articles in preparation for in-class discussion. For each article, each individual student will prepare a one-page reflection on the article. In addition, one team of students will be assigned prepare a presentation for each article and to subsequently lead in-class discussion on the article and the safety issues it entails.

In parallel with the in-class material, teams will work together to prepare a term paper and final presentation. The term paper should present a case study of the team's choosing which examines a recent safety incident or issue of interest. The final paper should be approximately 15 pages in length with a minimum of 10 cited and incorporated references.

Course Policies

Attendance and/or Participation

Due to the discussion-based nature of the course, consistent attendance and participation is required of every student. Accommodation will be available for institute-approved absences; other instances should be discussed with the course instructor as soon as possible.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to

discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Pre- &/or Co-Requisites

This course is intended for junior or senior students, requiring completion of AE 3330: Introduction to Aerospace Vehicle Performance.

Use of Generative AI

The core intent of this course is to present each student with various perspectives of safety in the world around us; instances of failures of safety and the lessons we learn from those failures as well as the means of assuring the safety of future systems. As part of this course, students will be expected to read several articles and produce reflections based on each week's reading. These reflections are intended to be a means of thinking more deeply about each article, going beyond a summary of their contents to further include personal perspectives, opinions, and considerations based on the subject of each article. As such, the use of Generative AI is not allowed for graded submissions in this course, including the Individual Summaries Weekly Topics and Reading. While Generative AI may be used to aid in better understanding or summarizing articles, it is expected that the submitted summaries are the product of each student's sole effort.