EAS 8803 PSD Syllabus

Planetary Spacecraft Development (Credits: 3), Section PSD

Fall 2026

Instructor Information

Instructor: Christopher E. Carr

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General Course Information

Description

Planetary Spacecraft Development covers the conception, design, and analysis of space missions and vehicles with a focus on planetary science mission development. The course integrates learning and doing through both didactic aspects and a mission design study group research project. The course theme changes each semester and centers on a topical planetary science or exploration challenge.

This course is cross-listed as AE/EAS 4803 (undergraduate) and AE/EAS 8803 (graduate). There are no formal pre-requisites. As a graduate-level course, it is presumed that you have substantial prior knowledge in your disciplinary area(s). Most importantly, you must be ready to learn and solve problems that are not well defined at the outset.

Course Learning Outcomes

- Gain exposure to and experience with the science and engineering principles used to develop and refine the design of space missions and vehicles.
- Define and refine mission goals to determine mission needs, requirements, and constraints.
- Analyze the engineering impacts of space and planetary environments on spacecraft.
- Utilize comparative analysis of alternatives to select mission architecture elements.
- Create concepts for novel approaches, instrumentation, or systems required to achieve mission objectives.

- Contribute to the development of a pre-phase A study linking science goals to technical requirements and using these to drive spacecraft and mission design.

Required Course Materials

There are no required texts for the course. Course materials will be provided.

Grading Policy

The grading breakdown is as follows:

Grading Breakdown

- Attendance (as measured by surveys, quizzes, etc.): 20%
- Individual Assignments: 20%
- Individual Portfolio (collection of individual and group mission design contributions): 30%
- Final Presentation (based on group work related to mission design): 15%
- Final Report (based on group work related to mission design): 15%

Grading Scale: A: 90–100% | B: 80–89% | C: 70–79% | D: 60–69% | F: 0–59%

Description of Graded Components

Students are expected to contribute actively in class through discussions and group work. Each class will typically have a brief survey as a measure of attendance and may also have a short quiz. There will be several individual assignments related to didactic learning in the course. The portfolio assignment will be an edited compilation of individual contributions to the mission design aspect of the course. There will be no midterm and no final exam. In lieu of a final exam, there will be a final presentation and final report completed by groups or sub-groups as part of their contribution to the overall mission design goal.

Additional Criteria for Successful Completion

Final course grades at Georgia Tech are awarded on a scale of A–F with no +/- grades permitted. Students must earn a passing grade (D or above) to receive credit for the course.

Course Policies

Attendance and/or Participation

This class includes both asynchronous and synchronous activities, including group activities, which are a critical part of the learning process. Active participation is expected and will contribute toward your final grade. Attendance will be verified through post-activity quizzes/feedback.

More than one unexcused absence during the semester will result in a deduction in your attendance grade. Institute-approved absences will not count against you, and reasonable accommodation will be made for illness and emergencies. See https://catalog.gatech.edu/rules/4/ for more information about institute expectations and restrictions around attendance, including information about excused absences.

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 (https://catalog.gatech.edu/policies/honor-code/) and the student Code of Conduct (https://catalog.gatech.edu/rules/18/).

Any student suspected of cheating or plagiarizing 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.

Core IMPACTS

Not applicable.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (http://disabilityservices.gatech.edu/) at (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 (http://www.catalog.gatech.edu/rules/22/) articulates 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.

Instructor Prerogatives

The instructor reserves the right to determine and adjust the content, structure, pedagogical approach, instructional methods, assessment strategies, and course materials for this course, consistent with the instructor's professional judgment and academic freedom, and in compliance with Georgia Institute of Technology and University System of Georgia policies and principles. This includes the right to modify these elements during the semester as needed to best achieve the stated course learning outcomes and to respond to the evolving needs of the discipline and students enrolled in the course.