

GEORGIA INSTITUTE OF TECHNOLOGY
SCHOOL OF ELECTRICAL & COMPUTER ENGINEERING
Syllabus: ECE6390 Satellite Communications and Navigation Systems

ECE6390 Satellite Communications and Navigation Systems A/Q/QSZ

TTh (GT Atlanta campus)

Course Websites: Canvas Site, YouTube™ channel profdurgin

INSTRUCTOR INFORMATION:

Instructor	Email	Office Hours & Location
Prof. Gregory D. Durgin 507 Van Leer	durgin at gatech.edu	after class, others by appt, Zoom TBD

COURSE INFORMATION

Description

This course is a first-principles discovery of how satellite communications and radiolocation systems are designed and deployed. Topics include orbital mechanics, propagation, digital transmission, global positioning system, and other radiolocation issues.

Course Goals and Learning Outcomes

Students will develop a system-level understanding of how to analyze and design a RF communications satellite link and use this knowledge as part of a greater space mission design exercise. In addition to basic expertise related to satellite communications and navigation – astrodynamics, antennas and propagation, communications, and geolocation – the students will learn how to work on teams, to perform a system-level design, and to document their work for web presentation. A high-level topical overview of the course is found below:

- | | |
|----------------------------|---------------------------------|
| I. Orbital Mechanics | VI. Satellite Modulation |
| II. Spacecraft Systems | VII. Channel Impairments |
| III. Noise and Propagation | VIII. Global Positioning System |
| IV. Atmospheric Effects | IX. Future Navigation Systems |
| V. Antenna Design | X. Special Topics |

Graded Components

Assignments	Weight
Homework	10%
Midterm Quizzes (2)	50%
Final Project	40%

Description of Graded Components

Expect 6-8 homework assignments throughout the term, to be turned in during class or by email to the instructor. There will be 2 in-class (or DL proctored) quizzes throughout the term. There is a final term project due at the end of the semester that demonstrates a culminating grasp of satellite communications and space mission systems. Projects will be assigned midway through the term and may involve group work. Any work that has significant contributions from generative AI will receive a score of 0.

For all assignments and projects, late work is not accepted. Special accommodations can be made for medical emergencies, interviewing, and other important events, but only if sufficient advance notice is given to (and permission granted by) the instructor ahead of time.

Grading Scale

This course uses a traditional A (>90.0), B (>80.0), C (>70.0), D (>60.0), F (<60.0) grade scale unless special circumstances require a curve to achieve the recommended course GPA as specified by the ECE course catalog. Traditionally, this course target GPA is 3.50. I do not curve *downward* from the traditional grade scale.

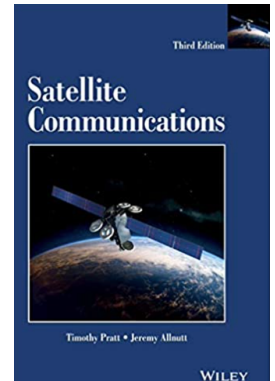
Classroom Management

This class will have a standard lecture format for the Atlanta campus. Selected recordings of these lectures as well as pre-recorded content will be made available through campus to deliver content to remote DL/Shenzhen campus remote students. Every effort will be made to ensure that student workload and time distribution is kept within reasonable limits for a 3-credit lecture course.

COURSE MATERIALS

Course Text:

Satellite Communications, 3rd edition, Pratt and Allnutt. Wiley, 2022. ISBN-13: 978-1119482178



Additional Materials:

Additional notes and materials for this course will be disseminated through Canvas. Content videos are available on the “profdurgin” YouTube channel.

COURSE EXPECTATIONS & GUIDELINES

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. For information on Georgia Tech’s Academic Honor Code, please visit <http://www.catalog.gatech.edu/policies/honor-code/> or <http://www.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.

Collaboration & Group Work

It is expected that each student upholds the Georgia Tech honor code when preparing work for this class. Everyone must turn in their own work (or group’s work where specified) without contribution from another person or source, whether homework, project, or test. For homework assignments, discussion of topics and concepts are encouraged among students provided all submitted work is still original.

Student Use of Mobile Devices

Students may not use mobile devices during tests other than as calculators. Observations of violations during test periods will be reported to the Office of Student Integrity.

Accommodations for Individuals with Disabilities

If you are a student with learning needs that requires special accommodation, contact the Office of Disability Services at (404)894-2563 or <http://disabilityservices.gatech.edu/>, as soon as possible to make an appointment to discuss your special needs and to obtain an accommodation 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

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. See <http://www.catalog.gatech.edu/rules/22/> for an articulation of some basic expectation 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.