

AAE 490E Introduction to Satellite Systems
Course Organization and Information
Spring Semester 2000

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Prerequisites: ECE 201 and Junior-level standing

Text/Notes: Fortesque and Stark, Spacecraft Systems Engineering Wiley Publishing Co., 1995. The course will stress course notes, so good class attendance practices are strongly encouraged.

Homework:

- Assignments handed out each week (approximately) and due one week later at the beginning of class.
- NO late assignments will be accepted for any reason.
- Collaboration on assignments is encouraged assuming the final product is distinct.

Satellite of the Week: Groups of 3-4 students will provide 20 minute presentation on selected satellites (more detailed description to follow)

Exams:

- Two exams will be scheduled during the semester.
- A comprehensive final will be given during the scheduled time.

Course Grade:

Homework - 20%
Satellite of the Week Lecture - 10%
Mid-semester Exams - 40%
Final Exam - 30%

Tentative Outline: Introduction to Satellite Systems

Topic		Lecturer	# of Lectures
Introduction	Syllabus, satellite history & overview, business issues, freq. spectrum	Heister	2
Space Environment	Thermal, radiation, and geomagnetic considerations. Solar wind, orbital debris	Heister	3
Propulsion System	Reqmts., chemical and electric systems, performance, launch vehicles	Heister	4
Structural Design	Loads analysis, materials, thermal loads, outgassing	Crossley	3
Power Systems	Solar cell performance analysis, batteries, array design and deployment	Wasynczuk	4
Fundamentals of Spacecraft Dynamics	Trajectory and Attitude Dynamics	Rotea	2
Orbit Mechanics	Classification (LEO, MEO, GEO, HEO), Orbit Geometry, Determination of Orbital Elements, Orbit Maneuvering	Rotea	5
Attitude Control	Pointing reqmts., Spinning vs. 3-Axis systems designs	Rotea	3
Thermal Control	Reqmts., radiators (fixed & deployable) heat pipes, MLI, louvres, heaters	Mudawar	3
Communications	Uplink and downlink analysis, TT & C, antenna sizing, freq. tradeoffs	Lehnert	5
Ground Stations	Hardware, software, satellite operations	Filmer	3
Satellite of the Week	8 Lectures, 1/2 Class Each	Students	4
Guest Lectures			2
Tests			2
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Total			45