Design of Space Vehicles and Systems II

AEROENG 4518

Credit Hours:
3.00

Course Levels:
Undergraduate (1000-5000 level)

Course Components:
Lecture
Recitation
Lab

Course Description:
Continuation of 4517: Preliminary and detailed design of space vehicle components. Design of a space vehicle/system, and mission scenarios simulation via computer software.

Prerequisites and Co-requisites:
Prereq: 4517, and enrollment as AeroEng-BS student (No pre-majors can enroll in this course).

Course Goals / Objectives:
- Provide students with conceptual and detailed spacecraft design experience
- Foster multidisciplinary thought processes and collaborations
- Train students in effective teamwork
- Refine students' technical communication skills through written reports and presentations

Course Topics:
- Minimum Buckling Load Design FEA with Hypermesh and Nastran contdChp 3 (FEA - Truss, Beam and Frame Structures), Frame and Rotating Beam
- Low Cycle/High Cycle Fatigue Design FEA with Hypermesh and Nastran Chp 4: FEA - Plates and Shells
- FEA with Hypermesh and Nastran Chps 5, 6: FEA - Solid Bodies
- Structural Integration and component mode synthesis of rigid and flexible appendages to main flight vehicle body for total vehicle structural dynamic analysis and design
- Structural Integration – component mode synthesis -continued Structural design Progress report (PR1)
- Spacecraft maneuver and attitude dynamics and control system design; actuators and sensors; pulsewidth modulation; launch-onorbit operational modes, planet and sun acquisition; momentum dumping; closed-loop attitude simulation
- Cost analysis and estimation methods, assesment of space environment Progress report Presentation (PRP2)
- STK/ODTK, MATLAB, MATLAB SIMULINK: orbit, attitude, propulsion, power, communication subsystems, coverage and access, sensors integration; space weather ANSYS, NX-IDEAS: structural and thermal analysis of configuration
- Final Year –end design report and presentations, submission of poster (FYR)

Designation:
Required