

THE DEPARTMENT OF AERONAUTICS AND ASTRONAUTICS

AA 421 SPACECRAFT AND SPACE SYSTEMS DESIGN II

SPRING QUARTER

CREDITS AND

CONTACT HOURS: 4 Credits, Three 50-minute lectures and one 2 hour group design session per week

COORDINATOR: Adam P. Bruckner, Professor of Aeronautics and Astronautics

TEXTBOOK: Space Mission Engineering: The New SMAD, J. R. Wertz, D.F. Everett, and J.J. Puschell, eds., Microcosm Press, Torrance, CA, 2011.

SUPPLEMENTAL MATERIALS:

Space Vehicle Design, 2nd ed., M. D. Griffin and J. R. French, AIAA Education Series, American Institute of Aeronautics and Astronautics, Washington, DC, 2004.

International Reference Guide to Space Launch Systems, 4th ed., S. J. Isakowitz, American Institute of Aeronautics and Astronautics, Washington, DC, 2004.

AIAA/ASME/IEEE conference and journal papers, etc.

CATALOG DATA: SPACECRAFT AND SPACE SYSTEMS DESIGN II, Required
Continuation of AA 420. Course content varies from year to year and is dependent on the design topic chosen for AA 420. Prerequisite: AA 420 Offered: Sp.

PREREQUISITES BY TOPIC: Preliminary system design developed in AA 420.

OUTCOMES:

- 1) Students will understand the function of spacecraft subsystems and how they might be designed.
- 2) Students will understand the state of the art in spacecraft system and subsystem design and the trade-offs between.
- 3) Students will experience choosing and narrowing high-level mission goals and requirements into specific tasks for design.
- 4) Students will experience self-organization, delegation, teamwork, communication to peers and visitors, fiscal and schedule maintenance.
- 5) Students will experience hands-on prototyping and testing of their chosen design.

RELATIONSHIP TO STUDENT OUTCOMES:

- a) An ability to apply knowledge of mathematics, science, and engineering
- b) An ability to design and conduct experiments, as well as to analyze and interpret data.
- c) An ability to design a system, component, or process to meet desired needs.
- d) An ability to function on multi-disciplinary teams.
- e) An ability to identify, formulate, and solve engineering problems.
- f) An understanding of professional and ethical responsibility.
- g) An ability to communicate effectively.
- h) The broad education necessary to understand the impact of engineering solutions in a global and societal context.

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- i) A recognition of the need for, and an ability to engage in life-long learning.
- j) A knowledge of contemporary issues.
- k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

TOPICS:

- 1) Special topics relevant to design project (6 class hours)
- 2) Continuation, refinement, and finalization of design (25 class hours)
- 3) Oral reports (5 class hours)
- 4) Preliminary design review (4 class hours)
- 5) Preparation of final report and summary report (10 class hours)