San Jose State University
Department of Aerospace Engineering

Course: AE 210 – Advanced Space Systems Engineering

Semester: Fall 2014

Prerequisites: BSAE or Instructor consent

Instructor: Dr. Periklis Papadopoulos,
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periklis.papadopoulos@email.sjsu.edu

Class Hours: Lecture: W 18:00 - 20:45
Office Hours: M,W 8:00 -9:00 p.m., M,W 10:15-11:00 a.m.

Textbook: Space Mission Analysis and Design
By: Wiley J. Larson, James R. Wertz

References: Understanding Space: An Introduction to Astronautics
By: Jerry Joe Sellers, William J. Astore, Robert B. Giffen, Wiley J. Larson,
Fundamentals of Space Systems by Vincent Piscac and
Robert Moore, Oxford Press.

Grading: Homework 300 points
1st Midterm 350 points
Final Project 350 points

Grading Scale: A+ minimum score 950
A minimum score 900
A- minimum score 850
B+ minimum score 775
B minimum score 725
B- minimum score 700
C+ minimum score 675
C minimum score 625
C- minimum score 600
D minimum score 500
F < 500


Course Goals:

1. Expose the student to the challenge of the integration of space system elements.
2. Provide in-depth exposure to at least one of the spacecraft subsystem groups.
3. Educate students in the area of analysis and optimization of multidisciplinary space systems during the conceive and design phases.

Course Learning Objectives:
Upon completion of the course students will be able to:

1. Decompose a complex space system to its sub-systems.
2. Perform design of space exploration studies.
3. Develop an aerospace system proposal, including specifications, project planning and mission scheduling.
4. Assess the impact of the mission space environment on the system design and operations.
5. Provide descriptions of the various elements comprising a space system.
6. Develop and codify a prescriptive approach to multidisciplinary modeling and quantitative assessment of new or existing system/product architectures.

Course Topics

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<th>Week</th>
<th>Lecture Topic(s)</th>
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<tr>
<td>1</td>
<td>Introduction, Course Overview, Space Mission Analysis and Design</td>
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<tr>
<td>2-3</td>
<td>Space environment</td>
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<td>4-7</td>
<td>Systems engineering process, mission objectives, design, subsystems, system-level coupling and interactions</td>
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<td>7-8</td>
<td>Proposal development for system and subsystem model development: system decomposition, interface control documentation,</td>
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<td>9</td>
<td>Space system design optimization and exploration techniques</td>
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<td>10</td>
<td>Design sensitivity analysis, trade-off studies and approximations and multi-objective system level optimization, spacecraft design and sizing</td>
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<td>11-15</td>
<td>Launch vehicles and space-craft architectures and subsystem presentations</td>
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<td>▶ Communications, Command and Data Handling</td>
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<td>▶ Mission Operations, Spacecraft Integration</td>
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<td>16</td>
<td>Miscellaneous Topics, Summary, Review</td>
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