Electrical and Computer Engineering 5230  
Spacecraft Systems Engineering  
Elective

Course Description:  
Spacecraft communications, telemetry systems, and command and data handling.  
Introduction to astrodynamics and orbit design.  Electrical power generation and storage.  
Spacecraft subsystems (e.g. guidance, navigation, and control).

Prerequisites:  
MATH 2270 and MATH 2280

Textbook:  
Fortescue, Peter and Swinerd, Graham, and Stark, John (eds.).  Spacecraft Systems  

References:  


Maral, Gerard and Vousquet, Michel.  Satellite Communications Systems: Systems,  

Sons, 1976.

Course Outcomes:  
1. Students will understand the time and coordinate systems used in space systems  
   engineering.
2. Students will gain a working knowledge of orbital mechanics through mastering orbital  
   simulation software.  The software package currently in use is Satellite Tool Kit from  
   Analytical Graphics.
3. Students will have conceptual understanding of spacecraft propulsion, launch systems  
   and thermal control systems.
4. Students will have conceptual understanding and can formulate a conceptual design for a  
   spacecraft solar battery power system.
5. Students will have an understanding and can formulate a conceptual design for a  
   spacecraft inventory system.
6. Students will be able to develop reactional system engineering trades based on a board.
Topics Covered:
- Spacecraft Costing
- Spacecraft Environments
- Orbital Mechanics and Mission Design
- Propulsion Systems
- Spacecraft Dynamics
- Spacecraft Attitude Control
- Spacecraft Power Systems
- Spacecraft Thermal System
- Spacecraft Telemetry Systems

Outcome Assessments (Grades):

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Homework</td>
<td>40%</td>
</tr>
<tr>
<td>Systems Design Project</td>
<td>20%</td>
</tr>
<tr>
<td>Exams/Quiz</td>
<td>20%</td>
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Class Schedule:
Class Three times a week for fifty minutes.

Contribution of course to meeting the requirements of Criterion 5:
3 credit hours of Engineering Topics and contains significant engineering design content

Relationship of course to student outcomes:

a. An ability to apply knowledge of mathematics, science, and engineering.

b. An ability to design a system, component, or process to meet desired needs.

e. An ability to identify, formulate, and solve engineering problems.

Instructor:
Charles Swenson, Professor
August 2013