Syllabus

ENME 3820/ENME 4800 - TPCs: Introduction to Aerospace Engineering II
Winter 2016

University of Denver
Mechanical and Materials Engineering Department

Meets: 101 CMK, 10:00-11:50 MW,
(4.0 Credit hours), Satisfies Undergraduate Technical Level/Graduate Course

Instructor: Dr. Jason Roney
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Course Description:
This course is focused on the aerospace discipline of space environment and orbital mechanics. The topics in this discipline are discussed in detail and provide aid in designing spacecraft/space missions. Some of the topics covered in this course include space environment, satellite orbits, spacecraft configurations, transfer orbits, and elementary space propulsion.

Prerequisites: ENME 2710, Engineering Thermodynamics I, ENME 2510, Engineering Dynamics I
Co-requisites: ENME 2651, Fluids I, ENME 2520, Engineering Dynamics II

Textbooks: Fortescue, P., Swinerd, G., Stark, J., Spacecraft Systems Engineering, 4th Edition, Wiley, 2011, 978-0470750124

Course Learning Objectives: The student should be able to

- Describe the reasons for going into space and the principles of rockets, including their trajectories.
- Select spacecraft configurations depending on the mission and identify the main elements of a satellite.
- Describe the features of the space environment and their consequences for space activities.
- Determine elementary satellite orbits, transfer orbits and maneuvers
- Describe and work with elementary space propulsion aspects: launch, velocity budget and rocket equation

Approximate Course Topics and Schedule:

Topics	Approximate Topics Covered and Sequence
1	Introduction to Space and Space Applications
2	Getting into Space
3	Orbital Mechanics: Satellite Orbits
4	Orbital Mechanics: Maneuvers and Transfers
5	Launchers and Rockets
6	Ground Systems and Operations
7	Space Environment
8	Spacecraft Design

**Book and Supplemental Material will be used to cover this material.

Grading:

Homework 40%
Projects 60%

***Homework*:** Problems will be given in a handout and will be due at the beginning of class on the due dates--these will be assigned approximately weekly. The homework should be done in the required format which was shown on the first day of class. These problems are meant for you to hone your analytical skills and broaden your conceptual knowledge of Spacecraft Systems. On every homework assignment there will be problems that are marked as "G" for graduate students. These homework problems are only required for graduate students, but undergraduate students may do them for extra credit.

In-Class "Homework": There will be some in-class participatory exercises that will count towards your homework grade. These types of exercises might include watching videos on a topic and filling out a viewing guide as well completing analytical problems relevant to the most recent material. These will be typically graded such that legitimate attempts and participation will give you most of the credit. These exercise will help me gage your progress and understanding of the topics along with encouraging you to attend and participate in class.

Projects: Three projects will be assigned to help you synthesize your understanding of Spacecraft Systems topics and its practical applications to everyday engineering practice. These projects will require a level of analysis beyond what is required in the homework, and will likely involve independent reports, presentations, and using computational tools such as Matlab, MS Excel, CFD tools, or programming or similar. The projects will be spaced to be due approximately every 2-3 weeks. On every project there will be problems that are marked as "G" for graduate students. These projects are only required for graduate students, but undergraduate students may do them for extra credit.

***Late Policy on Projects and Homework*:** 10% penalty if not turned in during class period, 25% one calendar day late, 50% two calendar days late, no late work after three calendar days.