

**Santa Clara University**  
**Department of Mechanical Engineering**

***MECH 372 –Space Systems Design and Engineering II***

**Catalog Description:** A review of the engineering principles, technical subsystems, and design processes that serve as the foundation of developing and operating spacecraft systems. This course focuses on subsystems and analyses relating to mechanical, thermal, power, software, and payload elements. Note: MECH 371 and 372 may be taken in any order. (Also listed as ENGR 372.) (4 units)

**Learning Outcomes:**

The student, upon completion of this course, will be able to:

- Understand basic design principles and practices as they relate to the development of space systems.
- Understand typical satellite mission classes and payloads and how they drive the design of space systems.
- Demonstrate familiarity with the basic concepts, components, design approaches, and key principles relating to basic mechanical and electronic components.
- Demonstrate familiarity with the basic concepts, components, design approaches, and key principles relating to satellite power systems.
- Demonstrate familiarity with the basic concepts, components, design approaches, and key principles relating to satellite thermal systems.
- Demonstrate familiarity with the basic concepts, components, design approaches, and key principles relating to satellite structural systems.
- Demonstrate familiarity with the basic concepts, components, design approaches, and key principles relating to satellite mechanisms.
- Demonstrate familiarity with the basic concepts, components, design approaches, and key principles relating to satellite flight processors and software.

**Topics Covered:**

- Introduction to Space Systems
- Introduction to basic mechanics and electronics.
- Spacecraft Power Systems.
- Spacecraft Thermal Systems
- Spacecraft Structural Systems, Configurations, and Materials.
- Spacecraft Mechanisms.
- Space System Conceptual Design Process.
- Spacecraft Flight Processors and Software.
- Spacecraft Payloads and Missions.

**Textbook & Software:**

Course notes and lecture slides provided by instructor  
Matlab/Simulink Student Edition, Mathworks.

**Suggested References:**

- Sellers, J. J., **Understanding Space: An Introduction to Astrodynamics**, 3rd Edition, McGraw Hill, 2004.
- Wertz, J. and Larson, W., eds., **Space Mission Analysis and Design**, 3rd Edition, Kluwer Academic, 1999.
- Fortescue, P., ed., **Spacecraft Systems Engineering**, 3rd Edition, John Wiley & Sons, 2003.
- Pisacane, V., and Moore, R., eds., **Fundamentals of Space Systems**, Oxford University Press, 1994.

**Grading:** The course grade will be based on homework and exams.

**Course Type:** Elective, graduate level Engineers. Required for Lockheed Martin Space Systems depth areas in the Mechanical, Electrical and Computer Engineering Departments.

**Prerequisites:** None.

**Co-requisite:** None

**Engineering Honor Code:**

All students taking courses in the School of Engineering agree, individually and collectively, that they will not give or receive unpermitted aid in examinations or other course work that is to be used by the instructor as the basis of grading.

**Disability Accommodation Procedure:**

To request academic accommodations for a disability, students must contact Disabilities Resources located on the second floor of Benson. Phone numbers are (408) 554-4111; TTY (408) 554-5445. Students must register and provide documentation of a disability to Disabilities Resources prior to receiving academic accommodations.

**Prepared By:** Christopher Kitts

**Date:** 09/04/2016