# Course Description

**Department**  
03 Mechanical, Automotive and Aeronautical Engineering

**Course title**  
Space Flight Dynamics and Space Environment

**Hours per week (SWS)**  
4

**Number of ECTS credits**  
6

**Course objective**  
Students will learn how to analyze and plan a space mission. The student will be proficient in applying methods of classical orbital mechanics including perturbation methods. Computer models for attitude determination and control will developed by the student. An understanding of the near earth space environment, satellite types, and current space missions will be gained.

**Prerequisites**  
none

**Recommended reading**  
- David Vallado, Fundamentals of Astrodynamics and Applications, Microcosm Press  
- Brown, Charles D., Elements of Spacecraft Design, AIAA Education Series  

**Teaching methods**  
Laboratory Instruction, Computer and Simulation Project

**Assessment methods**  
Exam

**Language of instruction**  
English

**Name of lecturer**  
Karl H. Siebold, Ph.D.

**Email**  
siebold@hm.edu

**Link**

**Course content**  
- Theory of Orbital Mechanics, Spacecraft Attitude, and Satellite Systems  
  - Kepler's law, coordinate systems of the solar system, perturbation theory, observation and visibility of Earth satellites, orbital maneuvers, thermal properties, micrometeoroids and space debris, orbital attitude analysis and control, mission planning and operation, satellite types, systems and utilization.  
- Programming of an Orbital Propagation Tool  
  - Writing of orbital mechanics functions, define interface requirements, testing and verification of software code.

**Remarks**  
Master level course, required for the aerospace master degree program