DEPARTMENT OF AERONAUTICS AND ASTRONAUTICS
AA 310  ORBITAL AND SPACE FLIGHT MECHANICS

AUTUMN QUARTER

CREDITS AND CONTACT HOURS:  4 credits, Four 50-minutes lectures per week.

COORDINATOR:  James Hermanson, Professor of Aeronautics and Astronautics


CATALOG DATA:  ORBITAL MECHANICS, Required

PREREQUISITES BY TOPIC:  1) Calculus and analytic geometry
2) Differential equations
3) Engineering dynamics

OUTCOMES:  1) Students will have a general understanding of space flight systems and how different engineering disciplines contribute to the success of missions, both in near-Earth orbit and interplanetary orbits.
2) Students will understand the application of Newton's laws for particles and show skill in applying them to model spaceflight trajectories.
3) Students will understand the application of modern computational tools for the calculation of spacecraft motion.

RELATIONSHIP TO STUDENT OUTCOMES:
   a) An ability to apply knowledge of mathematics, science, and engineering
   e) An ability to identify, formulate, and solve engineering problems
   k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

TOPICS:  1) Introduction to space missions and systems, two-body problem, Newton’s laws.
2) Trajectories, conic sections.
3) Orbital elements, coordinate systems.
4) Kepler’s Equation
5) Orbit determination.
6) Orbital maneuvers, rocket dynamics
7) Interplanetary trajectories, patched conics.