

1. Course number and name
EML 4930 Advanced Dynamics
2. Credits and contact hours
3 cr, 2.5 contact hours (2 hrs. 30 min. lecture)
3. Instructor's or course coordinator's name
Instructor: Dr. Carl Moore, Coordinator: Dr. Jonathan Clark
4. Text book, title, author, and year
Engineering Dynamics, Ginsberg, J., 2007
 - a. *References, Additional Resources*
 - Advanced Dynamics, Greenwood, D., 2006
 - Applied Dynamics, Moon, F., 2008
 - Principles of Dynamics, Greenwood, D., 1988
 - Analytical Dynamics, Baruh, H., 1999
 - The Variational Principles of Mechanics, Lanczos, C., 1986
5. Specific course information
 - a. *brief description of the content of the course (catalog description)*
Topics include particle and rigid body kinematics, particle and rigid body kinetics, D'Alembert Principle, Lagranges equations of motion, system stability, computational techniques, orbital dynamics, multi-body dynamics.
 - b. *prerequisites or corequisites*
Prerequisite: Senior standing
 - c. *indicate whether a required, elective, or selected elective course in the program*
Selected Technical Elective course
6. Specific goals for the course
 - a. *Course Outcomes*
 1. Generate equations of motion in various coordinate systems
 2. Construct relative kinematics equations for rigid body systems
 3. Develop the kinematics equations for interconnections and linkages
 4. Synthesize equations of motion for rigid body systems using various principles
 5. Write computer simulations to investigate simple rigid body kinetics
7. Brief list of topics to be covered
 - Basic principles in particle dynamics
 - Extension of basic principles to systems of particles
 - Relative motion including transformations, velocities, and accelerations
 - Generalized coordinates, constraints, virtual work
 - Mass moments of inertia, transformation of coordinate axes, principle moments of inertia
 - Rigid body kinematics and dynamics including Euler angles, linear and angular momentum, equations of motion, energy and work, and Lagrange's equations