

1. **MEEG301** **Machine Design-Kinematics and Kinetics**
2. **Credits 3** **Contact Hours 3**
3. **Fall 2016** Dr. James Glancey, Dr. Michael Keefe, and Dr. Dustyn Roberts
Spencer Lab
4. **Textbook** *Design of Machinery* - "An Introduction to the Synthesis and Analysis of Mechanisms and Machines," 5th Edition, Robert L. Norton, McGraw-Hill, 2012

Other Supplemental Materials: None.

5. Specific course information

- a. **Catalog Description:** Kinematic analysis of mechanisms and machines, kinematic synthesis, cam design, gear train analysis and machine dynamics.
- b. **Prerequisite:** C- or better in MEEG211 or CIEG311, Dynamics.
- c. **Course is required.**

6. Specific goals for the course

- a. **Specific Outcomes of Instruction:** This course presents kinematics analysis; that is, position, velocity and acceleration analysis; kinetics or dynamic force analysis; and synthesis of planar linkage mechanisms. Cam design and kinematics of gear and gear trains of different gear types are also discussed in this course. The students are assigned a practical engineering design/manufacturing project to further expose each student to traditional manufacturing via the machine shop. After this course, the students should acquire the knowledge to visualize and analyze a predetermined motion and design simple planar mechanisms to perform that specified motion.
- b. **Student Outcomes Addressed:**
 - Outcome f: an understanding of professional and ethical responsibility; and
 - Outcome h: broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.

7. Brief list of topics to be covered

Constrained rigid-body motion applied to machines

- Kinematics of constrained rigid-body systems
 - Mobility
 - Graphical and analytical synthesis for linkages
 - Position analysis
 - Velocity analysis
 - Acceleration analysis
- Kinetics of constrained rigid-body systems
- Cam design and analysis
- Gear-train design and analysis