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,

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 educations 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