1. ME 3222, Mechanisms & Machine Design

2. 4 credits, 4 contact hours


5. Specific course information:
   a. Catalog description: Analysis and synthesis of motion in machines. Shaft design. Selection of standard mechanical components such as bearings and fasteners. Gear design and gear trains. Machine design project: design new machines that fulfill customer specifications.
   b. Prerequisites: CSCI 1113, ME 3221 (concurrent registration allowed).
   c. Required course.

6. Course outcomes (related ABET student outcomes indicated in square brackets):
   a. An ability to analyze and design mechanisms to create arbitrary motion. [1,2]
   b. An ability to use modern software tools for linkage synthesis. [1,2]
   c. An ability to analyze and design basic power transmission systems that use gears, shafts and bearings. [1]
   d. An ability to apply stress based fatigue life estimation techniques to machine components such as shafts. [1]
   e. An ability to design and construct a working mechanism in small teams, including synthesis and engineering based machine component selection, and to document the design in a detailed report. [1,2,3,4,5,7]

7. Course topics:
   a. Kinematics and mechanisms
      i. Degrees of freedom
      ii. Precision position synthesis of linkages
      iii. Linkage analysis: displacement, velocity, acceleration, mechanical advantage, dynamics
   b. Machine components
      i. Shaft design
      ii. Bearing selection
      iii. Gear design: simple and planetary gear trains, gear selection
      iv. Other machine elements, such as power screws, fasteners and springs