1. Course number and name
   EML3018C Mechanical Systems II

2. Credits and contact hours
   4 cr, 5.5 contact hours (2.5 hours lecture, 3 hours lab)

3. Instructor’s or course coordinator’s name
   Instructor: Dr. Patrick Hollis, Coordinator: Dr. Carl Moore

4. Text book, title, author, and year

5. Specific course information
   a. brief description of the content of the course (catalog description)
      This is the second course in a sequence of two courses intended to provide the essential tools for the design and analysis of mechanical systems. Emphasis is on materials; stress analysis; shaft design; bearings and lubrication; fasteners and connectors; joints; clutches; brakes; couplings and flywheels; flexible elements; shafts; computer simulations and models of components and systems; team class projects involving dissection of existing machines and design and manufacture of new mechanical systems.
   b. prerequisites or corequisites
      Prerequisite: EML3017C
      Corequisite: EML3012C
   c. indicate whether a required, elective, or selected elective course in the program
      Required course

6. Specific goals for the course
   a. Course Outcomes
      1. Determine when a component will fail statically given loading [1]
      2. Determine when a component will fail under dynamic conditions given loading and life requirements [1]
      3. Design and analyze simple gear trains to transmit power and motion [2, 3, 4]
      4. Design and analyze simple shafts for given loading conditions and other design requirements [2, 3, 4]
      5. Calculate deflection and slope for loaded shafts [2, 4]
      6. Select suitable bearings for a particular application [2, 3, 4]
      7. Generate computer models of components and systems of machine components [2, 3, 4, 5]
      8. Generate engineering drawings of components and systems for manufacture [3, 4, 5]
      9. Present and use the results of research into a design topic not covered in class [6]
      Numbers refer to Course Objectives below, e.g. for course outcome 8, [3, 4, 5] refers to course objectives 3, 4, and 5.
   b. Course Objectives and Relation to Student Outcomes
      1. To explain and demonstrate the failure analysis of various materials under static and dynamic loading conditions [1, 5, 10]
      2. To introduce standards and formulae for the analysis and design of various mechanical components (gears, bearings, shafts, fasteners, etc.) [1, 3, 5, 10]
      3. To introduce techniques to assemble components into simple mechanical systems [1, 3, 5, 10]
4. To introduce computer software for the analysis and design of components and systems [3, 5, 10]
5. To provide tools and examples for the design of various mechanical systems [1, 3, 5, 7, 10]
6. To provide opportunities to use available resources to collect, interpret and present appropriate information for use in the design of mechanical systems [9] Numbers refer to Departmental Student Outcomes, e.g. for course objective 3, [1, 3, 5, 10] refers to student outcomes 1, 3, 5, and 10.

7. Brief list of topics to be covered
   - Design
   - Constraints and Degrees of Freedom
   - Gears and Gear Trains
   - Shafts, Keys, and Couplings
   - Bearings
   - Flexible Elements
   - Stress and Deflection
   - Static Failure
   - Dynamic Failure and Fatigue