1. **Course number and name**  
   **Engr464: Mechanical Design**

2. **Credits and contact hours**  
   3 credit hours: two 50-minute lecture sessions/week and one 2-hour-45-minute laboratory session/week

3. **Instructor’s or course coordinator’s name**  
   Instructor: Kwok Siong Teh, Associate Professor of Mechanical Engineering  
   Course coordinator: Kwok Siong Teh, Associate Professor of Mechanical Engineering

4. **Text book, title, author, and year**  
   
   a. **other supplemental materials**  

5. **Specific course information**  
   a. **brief description of the content of the course (catalog description)**  
      Application of principles of mechanics, materials science, and stress analysis to design components and machines. Mechanical behavior of materials. Synthesis and analysis of major machine design project.

   b. **prerequisites or co-requisites**  
      ENGR 364: Materials and Manufacturing

   c. **indicate whether a required, elective, or selected elective course in the program**  
      Required for Mechanical Engineering.

6. **Specific goals for the course**  
   a. **specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.**  
      
      - Students will demonstrate the ability to quantify the mechanical behavior of materials under elastic, elastoplastic, and plastic deformation  
      - Students will demonstrate the ability to predict materials failures under static and dynamic loading using appropriate choice of failure theories
Students will demonstrate they can perform stress analysis on simple mechanical components in order to obtain the correct geometry.

Students are able to design common mechanical components and systems, including but not limited to fasteners, shafts, bearings, springs, weldment, and gears.

Students are able to design and produce a working system using common mechanical components and mechanisms.

Students will demonstrate the ability to perform in a team environment via engaging in team-based and scenario-based in-class design activities and mini design projects.

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

Course addresses ABET Student Outcome(s): a, b, c, d, e, g, h, i, j, k.

7. Brief list of topics to be covered

- Design of shafts and shaft components
- Design and selection of screws, fasteners and non-permanent joints
- Understanding of welding, bonding, and design of permanent joints
- Design and selection of mechanical springs
- Design and selection of rolling contact bearings and journal bearings
- Design and selection of gears – spur, helical, bevel, worm gears
- Design and selection of couplings and flexible mechanical elements