1. *Course number and name*
   ENGR 467: Heat Transfer

2. *Credits and contact hours*
   3 credit hours. Three 50-min or two 1-hr, 15-min lectures per week.

3. *Instructor's or course coordinator's name*
   Instructor: Ed Cheng, Associate Professor
   Course coordinator: Ed Cheng, Associate Professor

4. *Text book, title, author, and year*
   T. L. Bergman, A. S. Lavine, F. P. Incropera, and D. P. DeWitt. *Introduction to Heat Transfer*, 6th edition, John Wiley & Sons, Inc., 2011.

   a. *other supplemental materials*
      (none)

5. *Specific course information*
   a. *brief description of the content of the course (catalog description)*
      Fundamental principles of heat transfer with applications to design. Conduction, transient and steady state; free and forced convection; radiation. Heat exchangers.

   b. *prerequisites or co-requisites*
      ENGR 303, ENGR 304.

   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 that they can solve complex one-dimensional steady conduction problems using resistive networks.
      - Students will demonstrate that they can solve single lumped parameter unsteady problems.
      - Students will demonstrate that they can evaluate the laminar and turbulent forced convective heat transfer on flat plates.
      - Students will demonstrate that they can evaluate convective heat transfer in pipes and across cylinders.
      - Students will demonstrate that they can evaluate free convection heat transfer for common geometries.
      - Students will demonstrate that they can evaluate heat exchanger performance using the LMTD and NTU-Effectiveness methods.
      - Students will demonstrate that they can evaluate radiant energy exchange in simple black and gray enclosures.
      - Students will demonstrate that they can evaluate a geometrical complex conduction problem using a finite element computer program.

- Students will demonstrate that they can solve a complex heat transfer problem using a spreadsheet program.
- Students will demonstrate that they can apply selected principles of the course to practical design problems.
- Students will demonstrate that they can write a competent technical report.

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, c, e, g, i, k.

7. Brief list of topics to be covered

- The subject of heat transfer and its applications
- Steady, one-dimensional conduction including convective boundaries
- Steady two-dimensional conduction
- Introduction to numerical analysis of conduction heat transfer
- Unsteady conduction heat transfer
- Introduction to the theory of convective heat transfer
- Correlations for forced convective heat transfer
- Correlations for natural convective heat transfer
- Analysis of heat exchangers
- Radiation heat transfer in gray enclosures