1. **Course number and name**
   ENGR 425: Reinforced Concrete Structures

2. **Credits and contact hours**
   3 credit hours; three 50-minute lecture sessions/week, or two 1-hr-15-minute lecture sessions/week, depending on semester

3. **Instructor’s or course coordinator’s name**
   Instructor: Wenshen Pong, Professor of Civil Engineering
   Course coordinator: Wenshen Pong, Professor of Civil 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)**
   Design of reinforced concrete structural systems. Elements of systems include beams, slabs, columns, and connections. Emphasizes Ultimate Strength approach to safety and serviceability considering bending, shear, and axial loads.

   b. **prerequisites or co-requisites**
   ENGR 323: Structural Analysis

   c. **indicate whether a required, elective, or selected elective course in the program**
   Elective for Civil 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.**
      - The student will demonstrate a knowledge of mechanics of reinforced concrete.
      - The student will demonstrate a knowledge of reinforced concrete behavior when subjected to bending, axial load and torsion.
      - The student will demonstrate a knowledge of whether optimum design has been achieved.
      - The student will demonstrate a knowledge of design procedures for reinforced concrete structures.
      - The student will demonstrate a knowledge of the design method: Ultimate Design Method. The student will demonstrate knowledge of the design of columns.
      - The student will demonstrate knowledge of the design of beams.
      - The student will demonstrate a knowledge of the design of reinforced concrete slabs.
      - The student will demonstrate a knowledge of the design of footings.
- The student will demonstrate skill in solving practical engineering problems through project assignments.
- The student will demonstrate an understanding of the design building codes and the background of codes.
- The student will demonstrate skill in applying codes and specifications to design reinforced concrete structural members.

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, i, k.

7. Brief list of topics to be covered
   - Structural Design Process and Principles.
   - Reinforced Concrete Behaviors and Properties.
   - Flexure: Beams
   - Flexure: T Beams
   - Shear in Beams
   - Torsion
   - Development, Anchorage, and Splicing of Reinforcement
   - Serviceability
   - Continuous Beams
   - One-way Slabs
   - Columns: Combined Axial Load and Bending
   - Slender Columns
   - Footings