1. Course number and name
   ENGR 434 Principles of Environmental Engineering

2. Credits and contact hours
   3 units. Two 75-minutes or three 50-minutes lecture per week.

3. Instructor’s or course coordinator’s name
   Instructors: Elahe Enssani, Ph.D., P.E.
   Course coordinator: Elahe Enssani, Ph.D., P.E., and Associate Professor of Civil Engineering

4. Text book, title, author, and year
   Other supplemental materials
   Class Reader (and all course material including HW) on SFSU ILearn.

5. Specific course information
   a. brief description of the content of the course (catalog description)
      Principles and fundamentals of environmental engineering. Topics include water resources, ground hydrology, water quality, water chemistry, water and wastewater treatment, air quality, and solid waste management.

   b. prerequisites or co-requisites
      ENGR 304 (Fluid Mechanics, may be taken concurrently)
      CHEM 115 or 180 (Chemistry)

   c. indicate whether a required, elective, or selected elective course in the program
      Required 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.**  
      - Develop student understanding of the basic concepts in water resources.  
      - Develop student understanding of the fundamental principles of water chemistry as needed in environmental engineering.  
      - Develop student understanding of the fundamentals of water quality parameters and criteria.  
      - Develop student understanding of the fundamentals of water treatment processes.  
      - Acquaint student with fundamentals of wastewater collection systems design.

   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, e, i.

7. **Brief list of topics to be covered**  
   - Hydrologic Cycle.  
   - Municipal Water consumption and water resources.  
   - Ground water hydrology.  
   - Water law doctrines.  
   - Reservoir Design, Transmission Facilities, distribution systems.  
   - Water quality parameters.  
   - Water chemistry.  
   - Drinking water standards.  
   - Disinfection.  
   - Water treatment processes.  
   - Wastewater collection, sewer systems.  
   - Wastewater treatment processes.  
   - Solid Waste/Hazardous Waste Management  
   - Air Quality Criteria/Management  
   - Contemporary issues Global Climate Change/Sustainability/Energy and Environment