1. MME 4309, Corrosion

2. 3 credits and 2.67 contact hours per week

3. Guikuan Yue

4. Principles and Prevention of Corrosion (Second Edition). By Denny A. Jones. Prentice Hall, 1996. ISBN: 0-13-359993-0. .
   Other supplemental materials: handouts, readings, topics from reference books and periodicals, such as: Fundamentals of Electrochemical Corrosion. By E.E. Stansbury and R.A. Buchanan. 2000 ASM International. ISBN: 0-87170-676-8.; Electrochemical Techniques in Corrosion Science and Engineering. By Robert G. Kelly, John R. Scully, David W. Shoesmith and Rudolph G. Buchheit. 2003 by Marcel Dekker, Inc. ISBN: 0-8247-9917-8.

5. Specific course information
   a. Application of electrochemistry and engineering principles to the corrosion, passivity and protection of metals and alloys.
   b. MME 2303 with a grade of "C" or better
   c. Required course.

6. Specific goals for the course
   a. Specific learning outcomes of instruction:
      - Understand the concepts associated with electrochemical aspect of corrosion and cell potentials. Analyze electromotive force, Ionic activity and cell polarization (Exam I)
      - Apply Nernst equation to calculate the rest potential and activities at equilibrium. Understand the stability of ions in solution and calculate activity coefficient using Debye-Huckel equation. (Exam I & II)
      - Apply the species complexation theory to calculate equilibrium concentrations (activities) in solution and equilibrium constant (Keq) Determine the best materials selection in Sulfuric acid, Nitric acid, Hydrochloric acid , HF and high temperature solution (Exam Ii & III)
      - Analyze and classification of various corrosion behaviors; Galvanic, Erosion, Crevice, Stress, Pitting and apply Eh-pH diagram to calculate the activities and pH of solution at equilibrium state (Exam III)

   b. Criterion 3 student outcomes addressed by the course: High content of Student Outcome 1 and 7, and significant coverage of Student Outcome 2.

7. A brief list of topics to be covered:
   Basic concepts; thermodynamics; kinetics; passivity; corrosion rate calculation; corrosion

testing; corrosion control; high temperature corrosion; contemporary issues.