1. MME 4309, Corrosion

2. 3 credits and 2.67 contact hours per week

3. Guikuan Yue


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.