MATL 5600: Corrosion – 3 hrs. – New Syllabus

Course Description: Fundamentals of the chemical degradation of materials. Types and methods for prevention or minimization of corrosion.

Prerequisite: CHEM 1040

I. Course Content/Objectives

1. Objectives
   Provide the student with a basic understanding of how corrosion occurs and how to apply this understanding to the prevention and control of corrosion.

2. Tentative Schedule and Outline (indicate weeks/lectures for each topic)
   Introduction ................................................................. 1 class
   Principles
     Thermodynamics ........................................................................................................ 10 classes
       Equilibrium Potentials
       Electrode Potentials
       Pourbaix Diagrams
     Kinetics .................................................................................................................. 9 classes
       Diffusion
       Exchange Current Density
       Polarization
       Mixed Potential Theory
     Passivation ............................................................................................................ 3 classes
   Types of Corrosion
     Uniform ............................................................................................................. 2 classes
     Localized ........................................................................................................... 4 classes
       Galvanic/Concentration,
       Pitting/Crevice
     Synergistic ........................................................................................................ 2 classes
       Stress
       Erosion
     Microstructure Related .................................................................................... 2 classes
       Intergranular
       Weld
     High Temperature ............................................................................................. 4 classes
       Hot Corrosion
       Oxidation
   Evaluation/Experimental Methods .......................................................................... 2 classes
   Prevention .............................................................................................................. 3 classes
     Cathodic Protection
     Coatings/Inhibition
   Poster Session ........................................................................................................ 1 class
   Exams ................................................................................................................ 2 classes
3. Textbook

II. Grading and Evaluation

1. Course requirements (papers, exams....)
   - Homework assignments
   - Two exams during regular class
   - One poster presentation
   - Final exam

2. Grading system
   - Homework ....................................................................................................................... 15%
   - Poster ........................................................................................................................ .5 
   - Exam 1 ....................................................................................................................... 25%
   - Exam 2 ....................................................................................................................... 25%
   - Final exam .................................................................................................................... 30%

3. Grading Scale
   \[ \begin{align*}
   90\% \leq \text{score} & \quad \rightarrow \quad \text{A} \\
   80\% \leq \text{score} < 90\% & \quad \rightarrow \quad \text{B} \\
   70\% \leq \text{score} < 80\% & \quad \rightarrow \quad \text{C} \\
   60\% \leq \text{score} < 70\% & \quad \rightarrow \quad \text{D} \\
   \text{Score} < 60\% & \quad \rightarrow \quad \text{F}
   \end{align*} \]

III. Statement related to policies on unannounced quizzes and class attendance

Policy regarding class attendance and unannounced quizzes will be set by the individual instructor. The detailed policy and any implication on grade evaluation will be announced to the students on the first day of class.

IV. Academic Honesty

All portions of the Auburn University Student Academic Honesty Code, as found in the Tiger Cub and defined in the SGA Code of Laws, Title XII, will apply in this class.

V. Statement regarding students with disabilities

If any student needs special accommodations he/she should see the instructor to discuss the situation. The student should bring the memo from the Program for Students with Disabilities (PSD) office. If the student does not have such a memo, he/she should make an appointment at the PSD office in 1232 Haley Center (844-2096) to discuss the situation.

Syllabus Prepared by J.W. Fergus