EGN 3365 ENGINEERING MATERIALS I
Course Syllabus

1. **Course number and name:** EGN 3365 Engineering Materials I

2. **Credits and contact hours:** 3 credits / Three 50 minute lectures each week

3. **Instructor’s or course coordinator’s name:** Dr. F. Presuel-Moreno


5. **Specific course information:**

   (a) Brief description of the content of the course (catalog description): The course deals with structure of material systems from the atomic, micro and macroscopic standpoints, equilibrium and non-equilibrium structures, relationship between structure and electrical, thermal, mechanical and failure properties of metals, ceramics and polymeric materials, and strengthening mechanisms in materials. A grade of C or better is required for the major.

   (b) Co-requisites: EGN 3343 Thermodynamics; EGN 3331 Strength of Materials

   (c) Indicate whether a required, elective, or selected elective course in the program: Required

6. **Specific goals for the course:**

   (a) Specific outcomes of instruction (course specific objective): The objective of the course is to provide the students with a basic knowledge of engineering materials and their applications.

   (b) Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course. The learning outcomes of the course (and related ABET Criterion 3) outcomes are:

   1. The students will have learned how the internal structure of a material (both at the micro and macro levels) controls the mechanical properties. (a,e,k)
   2. The students will have learned how dislocation motion is responsible for permanent deformation in metals and how the ability to undergo slip influences the mechanical properties of the material. (a,e,k)
   3. The students will be able to control the mechanical properties of materials through a variety of processes and the implications on materials selection and design. (a,e,k)
   4. The students will improve their writing skills through technical essay assignments summarizing laboratory procedures and demonstrations. (g,j)

7. **Brief list of topics to be covered:**

   - Atomic structure
   - Structural imperfections
   - Atomic movement
   - Mechanical testing
   - Solidification
   - Solid solutions
   - Mechanical working and heat treatment
   - Dispersion strengthening
   - Phase transformations
   - Metals and alloys
   - Corrosion
   - Ceramics
   - Polymers
   - Failure Analysis