REGULAR COURSE SYLLABUS

College of: Professional Studies
Department: Engineering and Engineering Technology
Prefix & Course Number: SSE 2200
Crosslisted With*: ___
Course Title: Materials Science
Transcript course title (30 characters): Materials Science
Check All That Apply: Required for Major: X Required for Minor: ___ Specified Elective: ___
Required for Concentration: ___ Elective: ___ Service Course: ___

To receive Title IV financial aid funds, all institutions of higher education must comply with the federal definition of a credit hour. The Higher Learning Commission requires institutions to maintain policies and procedures for verifying compliance with this definition.

Federal Credit Hour Definition: A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than:
(1) one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or ten to twelve weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time; or (2) at least an equivalent amount of work as required in paragraph (1) of this definition for other activities as established by an institution, including laboratory work, internships, practica, studio work, and other academic work leading toward the award of credit hours. 34CFR 600.2 (11/1/2010)

Credit Hours: 3 (2+2)

Face-to-Face or Equivalent Hours per course:
Lecture 30 Lab 30 Internship ___ Practicum ___ Other (please specify type and hours): ___

Additional Student Work Hours per course: 75

Schedule Type: ___ Grade Mode: L

Variable topics umbrella course: No X Yes ___ If Yes, number of credit hours allowed ___

Specified repeatable course: No X Yes ___

APPROVED: 10/12/2015

Department Chair/Institute Director 10-14-15

Dean 12-8-16

Associate VP, Academic Affairs 12-8-16

*If crosslisted, attach completed Course Crosslisting Agreement Form
Prefix and Course Number: SSE 2200

Prerequisite(s): CHE 1100/1150 with 'C' or better grades or permission of instructor
Corequisite(s): __
Prerequisite(s) or Corequisite(s): __

Banner Enforced:
Prerequisite(s): CHE 1100/1150 with 'C' or better grades
Corequisite(s): __
Prerequisite(s) or Corequisite(s): __

Registration restrictions: Level ___ Class ___ Program/Major ___ Student attribute ___

Catalog Course Description:
In this lecture/laboratory course students will be introduced to basic properties of materials, including the properties and behavior that govern their selection and design with emphasis on sustainable practices. Students will study materials including ferrous and non-ferrous metals, composites, plastics, ceramics, glass, wood, rubber and adhesives.

Required Reading and Other Materials will be equivalent to (Title, Author, Publisher, Copyright Date): Shackleford. (latest edition). Introduction to Materials Science for Engineers: MacMillan Publishing Company.

SPECIFIC (MEASURABLE) STUDENT BEHAVIORAL LEARNING OBJECTIVES:
Upon completion of this course the student should be able to:
1. Demonstrate knowledge of the mechanical properties of engineering materials.
2. Identify the physical properties of materials as such the mechanical, thermal, chemical, and electrical properties as found from laboratory experiences.
3. Apply material knowledge to the manufacturing process.
4. Identify metals using their atomic lattice structure.
5. Relate metallic phases to behavioral characteristics.
6. Analyze and identify pure and alloyed metals by their microstructure.
7. Identify and relate annealing, precipitation hardening, and tempering processes to the heat-treatment of metals.
8. Identify types, structures, properties and fabrication techniques of plastics, ceramics, and composite materials.

OUTLINE OF COURSE CONTENT:
I. Properties of Metals
   A. Mechanical
   B. Thermal
   C. Electrical
   D. Optical
II. Metals and Their Structures
   A. Atomic Lattice Structure
   B. Pre Metal and Alloy Structure
III. Characteristics of Metallic Phases
   A. Mechanical Behavior
   B. Thermal Behavior
   C. Electrical Behavior
IV. Microstructure of Alloys
   A. Two-phase Alloys
   B. Fe-C System
   C. Commercial Alloys
V. Heat Treatments of Metals
   A. Annealing
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B. Precipitation
C. Hardening and Tempering

VI. Plastics
A. Structures
B. Types
C. Properties
D. Fabrication Techniques

VII. Ceramics
A. Structure
B. Types and application
C. Properties
D. Fabrications Techniques

VIII. Composites
A. Coatings
B. Reinforced Materials
C. Wood

Evaluation of Student Performance:
1. Examinations
2. Assignments
3. Class projects and/or presentations and/or reports
4. Case study report