Catalogue Description: (3-0-3)

Status in Curriculum (Required or Elective): Elective (offered Fall or Spring)

Prerequisites: ME 216 Materials Science and Engineering

Co-requisites: None

Prerequisites by Topics:

Textbook: None.

References:

Coordinator: Dr. Saheb Nouari, Associate Professor

Goals:
This course is intended to introduce modern materials such as ceramics, plastics, composites, and nano-materials, and their electrical, thermal, magnetic, and optical properties. Applications of modern materials such as high-temperature materials and coatings in gas turbines will be emphasized.

Course Outline (Lectures and Laboratory Experiments):
1. Ceramics: structure, properties, applications. (7 hours)
2. Plastics: structure, properties, applications. (6 hours)
3. Composites: structure, processing, applications, nanocomposites. (7 hours)
4. Electrical properties of materials. (4 hours)
5. Thermal properties of materials. (3 hours)
6. Magnetic properties of materials. (3 hours)
7. Optical properties of materials. (3 hours)
8. High-temperature materials for gas turbine engines. (6 hours)
9. Coatings and applications. (5 hours)

Design Activities/Projects:
Students will learn, through term projects, how to design appropriate materials for specific applications.

Computer Usage:
Students are strongly encouraged to use computers in writing and presenting term projects.

Assessment Tools:
i- Mid-term Examinations
ii- Homework Assignments
iii- Term Project
iv- Final Exam

Course Learning Outcomes:
I- Students shall demonstrate a basic understanding of the structure of ceramics, plastics, composites, and nano-materials.
II- Students shall demonstrate a basic understanding of the electrical, thermal, magnetic, and optical properties of materials.
III- Students shall demonstrate the ability to understand the relationship between structure and properties of materials.

IV- Students shall demonstrate a basic understanding of the characteristics and properties of high temperature materials and their applications.

V- Students shall demonstrate the ability to understand basics of advanced coatings.

VI- Students shall demonstrate the ability to understand basics of advanced processing techniques.

VII- Students shall demonstrate the ability to design appropriate materials for specific applications

**Course Learning Outcomes mapped to Student Outcomes:**

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<td>Course-to-Student outcome mapping</td>
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* L: Little/None M: Moderate S: Strong

**Status of Continuous Improvement review of this Course:**

**Date reviewed: **----------- **Reviewed by:** Materials and Manufacturing Group

**Prepared by:** Dr. Saheb Nouari **Date prepared:** March 20, 2014