MET 352: METALLURGICAL ENGINEERING DESIGN II

CATALOG DATA:

MET 352 – METALLURGICAL ENGINEERING DESIGN I; 1 (1-0) Credits
Prerequisites: Junior standing or graduation within five semesters, MET 220, MET 232, MET 351. This course is the second semester of a two-course sequence in Junior Metallurgical Design that involve both lectures and design practice sessions. It is a continuation of MET 351. Topics are designed to incorporate engineering standards and realistic constrains, including most of the following considerations: economic, ethical, environmental and social. Focus on the design process, and the design method. The development of interdisciplinary teams is a high priority. The course integrates vertically and horizontally concepts from all areas of Metallurgical Engineering into a practical design project designed to train the students in the design practice. Fundamentals of the design process, specifications, decision-making, materials selection, materials process, experimental design, statistic process control and preliminary design are the focus. This course consists in the students playing the role of apprentices to design by teaming up with the interdisciplinary senior students in the senior capstone design projects.

TEXTBOOK:

Textbook: ENGINEERING DESIGN, a Materials and Processing Approach, George E. Dieter, McGraw-Hill Company, Third Edition, 2000. (Not required)
Reference: THE ENGINEERING DESIGN PROCESS, Atila Ertas and Jesse C. Jones, John Wiley & Sons, Inc., 1993. (Not Required)

INSTRUCTOR:

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Office Hours: Open office policy
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EXPECTATIONS:

The course focuses on the development and completion of a Design Project with vertical and horizontal integration of concepts from all areas of Metallurgical Engineering. The students are expected to put together the fundamental and applied knowledge acquired during the previous years of the engineering tenure. This means a comprehensive effort involving most of the components of real-world industrial design projects. This means a comprehensive effort involving most of the components of real-world industrial design projects. Specifically the students are expected to have a good working knowledge of:

- Principles of product and process design
- Problem solving skills
- Analysis skills on materials microstructure/property relationships
- Communication skills, both oral and written
- Materials Design and Materials Manufacture

COURSE OBJECTIVES:

The objectives of this course are to provide hands on practical experience on Metallurgical Engineering Design. Students participate as apprentices to design in The Interdisciplinary Senior Capstone Design Projects (IDSCDP) by working in teams under the direction and supervision of one or more Faculty mentors. In addition Junior students have an opportunity to team up in Interdisciplinary Senior Capstone Design Projects were they play the role of apprentices to the design process. During the development of the course the students will demonstrate acquire skills to:

- Assessment of need
- Proposal preparation
- Definition of design requirements
- Gather information
- Conceptualize various solutions
- Evaluation of design concepts and select a candidate design
- Work in an interdisciplinary team environment
- Communicate the design effectively by written reports and oral presentations

CLASS SCHEDULE:
Class will meet MW 3:00 to 3:50 in MI 222.

TOPICS:
Students will play the role of apprentices to Design Interdisciplinary Junior/Senior Design Projects. Topics are designed to incorporate engineering standards and realistic constrains, including most of the following considerations: economic, ethical, environmental and social. Focus on the design process, and the design method. The development of interdisciplinary teams is a high priority.

COMPUTER USAGE:
As required by lectures and projects

COURSE OUTCOMES:
During this course students will demonstrate the ability to:

- Work effectively in a team environment
- Integrate knowledge, vertically and horizontal and apply analytical tools from a variety of courses.
- Develop and implement experimental plans to evaluate possible solutions.
- Produce archival design drawings
- Manage the project effectively by using a project schedule and other management tools.
- Develop and implement appropriate and detailed manufacturing plans.
- Write progress and final design reports, incorporating ethical, environmental and societal issues pertinent to the specific ISCDP.
- Make effective oral presentations incorporating in the discussion ethical, environmental and societal issues pertinent to the specific ISCDP.
- Test and Evaluate Prototype performance.

RELATION OF COURSE OUTCOMES TO PROGRAM OUTCOMES: (d), (e), (f), (g)

LABORATORY:
As required by projects

ASSESSMENT AND EVALUATION:
Course Objectives

The course objectives are evaluated by the following methods:

- Written reports and oral presentations
- FE exam
- Exit exam
- Alumni survey
- Employers surveys
- Panel of Professionals

Course outcomes

The course outcomes are evaluated by the following methods:

- Written reports = 30%
- Oral presentations = 20%
- Professionalism = 20%
- Overall project performance = 30%

PREPARED BY:
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