

Department, number, and title of course:

IENG 304 Materials and Costing

Section: 200708-IENG-304-001

Type of course: Required

Catalog Description: IENG 304. 3 Hr. Utilize a problem based approach to materials selection considering material properties, mechanical properties, design requirements, and economic considerations in the selection of materials and manufacturing processes. Cost estimating basics and manufacturing cost models.

Prerequisites: MAE 243 and IMSE 377 (MAE 243 can be taken concurrently with IENG 304)

Co-requisites by topics: None

Textbook:

1. Introduction to Manufacturing Processes and Materials, Robert C. Creese, Marcel Dekker, 1992.
2. Estimating and Costing for the Metal Manufacturing Industries, Creese, Adithan, and Pabla, Marcel Dekker, 1992.

Instructor: B. Gopalakrishnan, PhD, PE, CEM, Professor, Dept. IMSE.
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Office hours: 1-2 MWF or by appointment

Course Objectives:

Utilize a problem-based approach to materials selection considering material properties, mechanical properties, design requirements, and economic considerations in the selection of materials and manufacturing processes. Cost estimating basics and manufacturing cost models for machining, casting, and forming.

Topics:

1. Introduction, Manufacturing Engineering, Manufacturing Management and Breakeven Analysis
2. Basic Material Properties-Crystal Structure, Density, Miller Indices
3. Basic Material Properties-Phase Diagrams, Invariant Reactions, Iron-Carbon Diagram
4. Mechanical Material Property Relationships, Engineering Stress-Strain, True Stress-Strain, Hardness
5. Methods for Increasing Mechanical Material Properties
6. Material Codes & Coding Systems
7. Design, Material & Cost Relationships
8. Design, Material & Cost Relationships-Continued
9. Cost Indexes, Cost Capacity Factors, and Improvement Curves
10. Cost Estimating Basics and the Costs of Estimates
11. Analysis of Overhead Expenses
12. Manufacturing Cost Models
13. Estimating Capital and Operating Costs

Contribution of course to meeting the professional component:

Engineering topics 100%, significant design content.

Course relationship to program educational outcomes:

1. Manufacturing cost estimation, mechanical material properties, physical material properties, improvement curves (outcome 1).
2. Apply strength of materials analysis to understand manufacturing concerns (Outcome 2).

Grading:

Exam I - September 14, 2007, 15%
Exam II – October 12, 2007, 15%
Exam III – November 14, 2007, 15%
Projects/Assignments/Homework – 20%
Quizzes – 10%
Final exam (as per WVU schedule) – 25%

The quizzes can be given at any time in any class without prior announcement.

Statement on Attendance:

Student attendance is mandatory unless excused by the instructor. The basis for an excused absence will follow University and IMSE policy. Students who are absent from class for any reason are responsible for all missed work. Students absent for a scheduled exam will not be given a make-up examination without a reasonable excuse in the view of the instructor based on appropriate documentation presented by the student. Students who miss a quiz will not be given a make-up quiz. Students who miss the final exam will not be given a make-up exam.

Statement on Social Justice:

West Virginia University is committed to social justice. I concur with that commitment and expect to maintain a positive learning environment based upon open communication, mutual respect, and non-discrimination. West Virginia University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Disability Services (293-6700). They will identify the nature of the accommodation your disability requires.

Prepared by: B. Gopalakrishnan

Date: 8/20/2007