IENG 304 Materials and Costing

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 for machining and welding.

Prerequisites: MAE 243 and IENG 377

Co-requisites by topics: None

Textbook:

Instructor: B. Gopalakrishnan, PhD, PE, CEM, Professor, Dept. IMSE.
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Office hours: 9-10 MWF

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
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
9. Cost Indexes, Cost Capacity Factors, and Improvement Curves
11. Analysis of Overhead Expenses
12. Manufacturing Cost Models - Metal Cutting Economics & Costing Model
13. Basic Costing for Casting Processes
14. Basic Costing for Forging Processes
15. 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 (outcome 1).
2. Apply strength of materials analysis to understand manufacturing concerns (Outcome 2).
Grading:
Exam I - 15%
Exam II –15%
Exam III –15%
Projects/Assignments/Homework – 20%
Quizzes – 10%
Final exam – 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 who miss a quiz or an exam will not be allowed to make it up, except in the case of a family or other legitimate emergency. Any exception will be allowed at the discretion of the instructor.

Statement on Social Justice:
West Virginia University is committed to social justice. I concur with that commitment. I expect to foster a nurturing learning environment that is based upon open communication, mutual respect, and non-discrimination. Our 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, you must make appropriate arrangements through Disability Services (293-6700). They will identify the nature of the accommodation your disability requires.

Prepared by: B. Gopalakrishnan