3.080.
Economic and Environmental Issues in Materials Selection

Instructors

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Today's Mechanics

- **Please fill in the sign-up sheet which is going around**
  - **Email list will be important for communicating with you about course updates**
- **Information requested**
  - **Name**
  - **Department**
  - **Year**
  - **Email**

Course Materials (Texts)

- **Texts on Reserve:**
  - *Engineering Economy, 12th ed,* **W Sullivan, E Wicks, and J Luxhoj, Prentice Hall, 2003**
  - *Materials Selection in Mechanical Design*, **Michael Ashby**
    - 3rd edition hardcopy on reserve
  - *The Hitch Hiker's Guide to LCA*, **H Bauman and A Tillman, Studentlitteratur AB, 2004**

Course Materials (other)

- **Course website**
  - **Used to distribute key course materials**
    - Syllabus, Lecture Notes, Solutions, Case Tools
- **Software**
  - **Spreadsheet, preferably Excel**
  - **Cambridge Engineering Selector – will be distributed**
  - **Simapro – Life-cycle Analysis – negotiating license**

Overview of Course

- **Philosophy**
  - **Engineers are highly trained in analysis**
  - **Engineers receive little training in evaluation**
  - **Evaluation of real projects must consider technical performance as well as strategic goals (e.g., cost and environment)**
- **Learning Objectives**
  - **Awareness of evaluation theories and tools**
  - **Framework to reveal production (technology) cost**
  - **Ability to address analyses with incomplete data**
  - **Appreciation for multi conditional solutions**

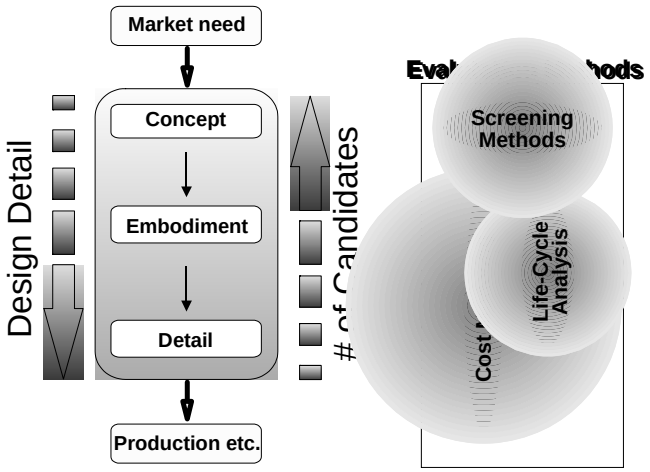
Layout of Course

- **Engineering Economics**
  - **Approaches to determine equivalence of economic activities**
- **"Classic" Materials Selection**
  - **Screening method to evaluate numerous alternatives**
  - **Identifies potential solutions**

Layout of Course (cont.)

- **Modeling Efficient Systems**
  - **Process-based cost modeling**
    - Generalized framework for understanding cash flows associated with production
- **Assessing Environmental Impact**
  - **Life cycle assessment**
    - Approaches for scoping environmental concern
    - Methods for quantifying impact

Evaluation Methods Must Match Stage of Decision Making



Major Assignments – Case Based Presentations

- **Group Assignment**
  - **15 minutes presentation**
- **Individual Assignment**
  - **3-5 page writeup**
- **Specific topics**
  - **Engineering Economics** (Due October 6)
    - Compare the case for a Hybrid vs. XYZ car
  - **Materials Selection** (Due November 1)
  - **Cost Modeling** (Due November 15)
  - **Life cycle assessment** (Due December 13)

Grading Guidelines

- **Problem Sets: 20%**
- **Unit projects**
  - **Eng econ 10%**
  - **Materials selection 10%**
  - **Cost modeling 15%**
  - **LCA (integrative) 15%**
- **Mid-semester quiz 1 – Engineering Econ: 15%**
- **Mid-semester quiz 2 – Material Selection & Cost modeling: 15%**

Calendar

- **Today:** **Intro and Overview**
- **Sept 13 – Oct 6:** **Engineering Economics**
- **Oct 13:** **EXAM: Engineering Economics**
- **Oct 18 – Nov 1:** **Materials Selection Methods**
- **Nov 3 – Nov 15:** **Process-based Cost Modeling**
- **Nov 17:** **EXAM: Matl Selection & Cost Modeling**
- **Nov 22 – Dec 13:** **Life-cycle Assessment**