ENGINEERING ECONOMICS

Introduction

In this course

Introduction to Engineering economics

Time Value of Money

Economic equivalence

Economic analysis of alternatives

i. Mutually exclusive alternatives
ii. Evaluating production operations and equipment

Replacement analysis

Depreciation accounting

Financial Statement Analysis

Text books

1. Engineering economy

   By Thuesen and Fabrycky

2. Contemporary engineering economics

   By Chan S Park

3. Engineering Economics

   By James L Riggs

4. Fundamentals of Financial Management

   By Prasanna Chandra

As engineers, what is our job?

Engineering :

A profession in which a knowledge of the mathematical and natural sciences is applied with **judgment** to develop ways to utilize **economically** the **materials and forces of nature** for the benefit of mankind.

-ABET

What is Economics

Economics is the study of how people choose to use resources.

What is engineering economics?

Engineering economics, previously known as engineering economy, is a subset of economics for application to engineering projects.

Engineers seek solutions to problems, and the economic viability of each potential solution is normally considered along with the technical aspects.

RESOURCES

LABOUR

CAPITAL

- **Real Capital (Physical Capital)**
  - Tools, buildings, machinery -- things which have been produced which are used in further production

Dollar Bills

- **Financial Capital**
  - Assets and money which are used in the production process
- **Human Capital**
  - Education and training applied to labor in the production process

Accounting Vs. Engineering Economics.

Evaluating past performance

Accounting

Evaluating and predicting future events

Engineering Economy

Past ***Present*** ***Future***

Two Defining Factors in Engineering Economic Decisions

The factors of time and uncertainty are the defining aspects of any engineering economic decisions

Principles of Engineering Economy

- Develop the Alternatives
- Focus on the Differences
- Use a Consistent Viewpoint
- Use a Common Unit of Measure
- Consider All Relevant Criteria
- Make Uncertainty Explicit
- Revisit Your Decisions

Five Types of Engineering Economic Decisions in Manufacturing Sector

- ✓ Service Improvement
- ✓ Equipment and Process Selection

- ✓ Equipment Replacement

- ✓ New Product and Product Expansion

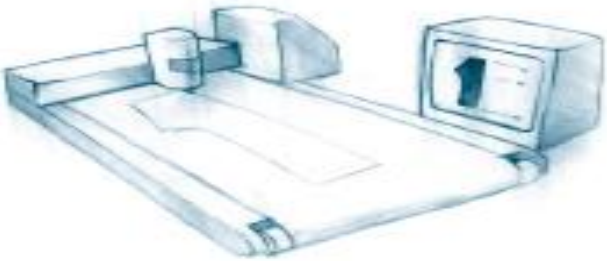
- ✓ Cost Reduction/Outsourcing

Service Improvement

- How many more jeans would Levi need to sell to justify the cost of additional robotic tailors?

A sales clerk measures the customer using instructions from a computer as an aid.

The clerk enters the measurements and adjusts the data based on the customer's reaction to the samples.



The final measurements are relayed to a computerized fabric cutting machine at the factory.

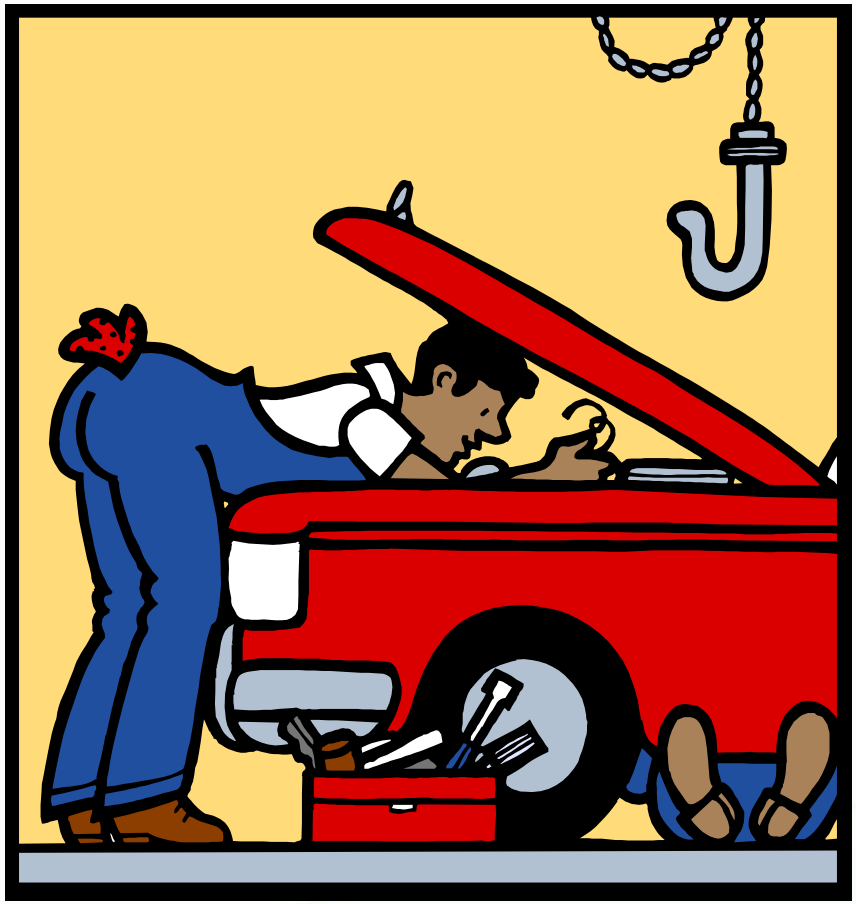
Bar codes are attached to the clothing to track it as it is assembled, washed, and prepared for shipment.

FIGURE 1.6 "From Data to Denim": Making customized blue jeans for women, a new computerized system being installed at some Original Levi's Stores allows women to order customized blue jeans

Equipment Replacement Problem

Now is the time to replace the old machine?

If not, when is the right time to replace?



New Product and Product Expansion

Shall we build or acquire a new facility to meet the increased demand?

Is it worth spending money to market a new product?

Example - MACH 3 Project

R&D investment: $750 million

Product promotion through advertising: $300 million

Priced to sell at 35% higher than Sensor Excel (about $1.50 extra per shave).

Question 1: Would consumers pay $1.50 extra for a shave with greater smoothness and less irritation?

Question 2: What would happen if the blade consumption dropped more than 10% due to the longer blade life of the new razor?

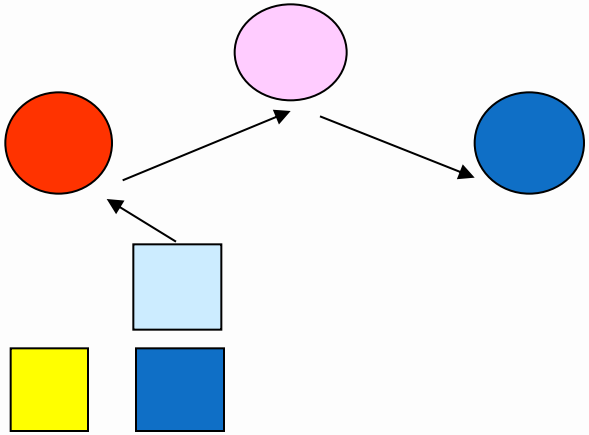
Cost Reduction/ Outsourcing

Should a company buy equipment to perform an operation now done manually?

Should spend money now in order to save more money later?

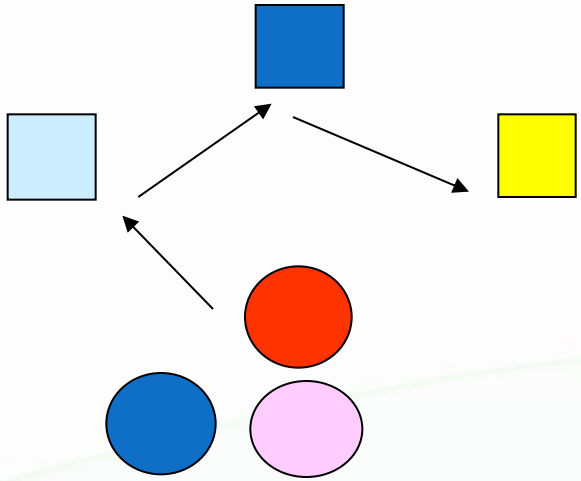
Service sector
Example -Healthcare Delivery

Which plan is more economically viable?



- Traditional Plan: Patients visit each service provider.

- New Plan: Each service provider visits patients



This course covers the fundamentals of engineering economics and basic accounting. It will help students understand how an organization can utilize its capital economically when it makes capital decisions.

The two major learning objectives are:

- ✓ To understand of the Economics of Engineering, which includes the Time Value of money.
- ✓ Secondly students need to know how to use Figures of Merit (NPV, IRR, BC etc.) in making engineering design and business decisions

THANK YOU