Engineering Economics

💡 Rational Decision-Making Process

→ Recognize the problem
→ Define the goals and objectives
→ Collect all the relevant information
→ Identify a set of feasible alternatives
→ Select the decision criterion to use
→ Select the best alternative

🛠️ The Engineering Economy involves

1. Systematic Evaluation of the Economic advantages.
2. Persuade acceptable solutions for problems.
3. demonstrate positive balance of benefits VS Costs.
4. Promote creative and innovative technologies and ideas.

📐 Types of Strategic Engineering Economic Decisions in Manufacturing Sector

❑ Service Improvement
❑ Equipment and Process Selection
❑ Equipment Replacement
❑ New Product & Product Expansion
❑ Cost Reduction

📊 Engineering Economy

🛠️ Principles of Engineering Economy

✏️ PRINCIPLE – 1

Develop Alternatives – alternatives need to be identified

✏️ PRINCIPLE – 2

Focus on Differences – compare between the outcome of the alternatives

✏️ PRINCIPLE – 3

Use a Consistent Viewpoint

✏️ PRINCIPLE – 4

Use Common Units to Measure

✏️ PRINCIPLE – 5

Consider All Relevant Criteria

✏️ PRINCIPLE – 6

Make Risk and uncertainty explicit – risk is inherented in future estimated outcomes

✏️ PRINCIPLE – 7

Revisit Your Decisions

⌛ Two Factors in Engineering Economic Decisions

Time and **uncertainty** are the defining aspects of any engineering economic decisions

📈 Economics

The study of **allocating resources** efficiently to satisfy human wants

How individuals and societies choose resources

⚡ Resources

Capital can be divided into three types:

• Real Capital (Physical) – Tools, buildings, machines, and things we **produce and use in further production**

• Financial Capital – **Assets and money** which are used in the production process

• Human Capital – **Education and training** applied to labor in the production process

🌎 Land

Everything on the land (e.g. water, air, minerals and sunshine)

Types of goods:

• Capital goods produced goods that are **used to produce other goods** and services (Durable)

• Consumer goods produced for **consumption** (Non-durable)

👷 Labor

The efforts, skills, and knowledge **people apply in the production process**

🏢 Capital

📝 Definitions

❑ **Investment** – The addition to Capital Stock

❑ **Depreciation** – Capital stock depreciates over time, as it wears out and is used up

❑ **Gross investment** – Measures investment before depreciation

❑ **Net Investment** – Measures gross investment minus depreciation

❑ **Investment can be in either**:
• Physical Capital: in machines
• Human Capital: in better education to increase labor productivity

🥷 Entrepreneurship

Someone who has the ability and desire to **establish startup** venture along with its risk, to make profits

There are many types of entrepreneurship, examples:

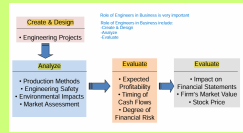
• Small business entrepreneurship
• Large company entrepreneurship

🃏 Role of Engineers in Business

Create & Design
• Engineering Projects

Analyze
• Production Methods
• Engineering Safety
• Environmental Impacts
• Market Assessment

Evaluate
• Expected Profitability
• Timing of Cash Flows
• Degree of Financial Risk
• Impact on Financial Statements
• Firm's Market Value
• Stock Price



🏗️ Large-Scale Engineering Project

• Requires a large sum of investment
• Takes a long time to see the financial outcomes
• Difficult to predict revenue and cost streams

Application of Fundamental Principles of Engineering Economics

• Principle 1: Nearby dollar worth more than a distant dollar

• Principle 2: All it counts is the differences among alternatives

• Principle 3: Marginal revenue must exceed marginal cost

• Principle 4: Additional risk is not taken without the expected additional return

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