3. **Engineering Economic Analysis**

Engineering Economics is a specific knowledge area of economics focused on engineering projects. Industrial engineers need to understand economic viability of any potential problem solution.

3.1. **Value and Utility**
   - 3.1.1. Understand the difference between value and utility in economics
   - 3.1.2. Understand relationship between value and utility and its importance in economics

3.2. **Classification of Cost**
   - 3.2.1. Understand costs to properly compare engineering alternatives
   - 3.2.2. First cost
   - 3.2.3. Fixed and variable cost
   - 3.2.4. Incremental and marginal cost
   - 3.2.5. Sunk cost

3.3. **Interest and Interest Formulas**
   - 3.3.1. Time value of money
   - 3.3.2. Equivalence involving interest

3.4. **Cash Flow Analysis**
   - 3.4.1. Present worth
   - 3.4.2. Annual equivalent
   - 3.4.3. Future worth
   - 3.4.4. Capitalized worth
   - 3.4.5. Benefit-cost ratio
   - 3.4.6. Payback periods
     - 3.4.6.1. Payback period
     - 3.4.6.2. Discounted payback period
   - 3.4.7. Rate of returns
     - 3.4.7.1. Internal rate of return
     - 3.4.7.2. External rate of return

3.5. **Financial Decision Making Among Alternatives**
   - 3.5.1. Proposal types
   - 3.5.2. Decision criteria for alternatives
   - 3.5.3. Decision criteria under limited funds
   - 3.5.4. Methods
     - 3.5.4.1. Ranking methods
       - 3.5.4.1.1. Present worth
       - 3.5.4.1.2. Annual worth
       - 3.5.4.1.3. Future worth
       - 3.5.4.1.4. Capitalized worth
3.5.4.2. Incremental method
   3.5.4.2.1. Internal rate of return (IRR)
   3.5.4.2.2. External rate of return (ERR)
   3.5.4.2.3. Benefit-cost ratio

3.6. Replacement Analysis
   3.6.1. Decision criteria for making replacement decisions
   3.6.2. Determining the economic life of an asset

3.7. Break-Even and Minimum Cost Analysis
   3.7.1. Evaluating two alternatives
   3.7.2. Evaluating multiple alternatives

3.8. Evaluation of Public Activities
   3.8.1. General welfare of public interests
   3.8.2. Financing public activities
   3.8.3. Benefit-cost analysis
   3.8.4. Identifying benefits, dis-benefits, and cost

3.9. Accounting and Cost Accounting
   3.9.1. General accounting
   3.9.2. Cost accounting
   3.9.3. Allocation of overhead

3.10. Depreciation and Depreciation Accounting
   3.10.1. Types of depreciation
   3.10.2. Consuming assets
   3.10.3. Depreciation methodologies
   3.10.4. Depletion
   3.10.5. Capital recovery

3.11. Income Taxes in Economic Analysis
   3.11.1. Profit and income taxes
   3.11.2. Individual income taxes
   3.11.3. Corporate income taxes
   3.11.4. Depreciation and income taxes
   3.11.5. Depletion and income taxes

   3.12.1. Cost estimating methods
   3.12.2. Service life estimation
   3.12.3. Judgment in estimating

3.13. Estimates and Decision Making
   3.13.2. Judgments in estimating
   3.14.1. Probabilistic methods related to decision making
   3.14.2. Decision trees

3.15. Decision Making Under Uncertainty
   3.15.1. Methods related to decision making in the absence of meaningful data
   3.15.2. Payoff matrix
   3.15.3. Laplace rule
   3.15.4. Maximin and maximax rules
   3.15.5. Hurwicz rule
   3.15.6. Minimax regret rule

3.16. Analysis of Construction and Production Operations
   3.16.1. Critical path (see Operations Engineering & Management knowledge area)
   3.16.2. Geographic location
   3.16.3. Economic operation of equipment
   3.16.4. Variable demand

REFERENCES:


