Course Objective:

After completing this course, students will be able to

- understand and describe the basic concept of economics, engineering economics, cost accounting and time value of money,
- assist in the valuation of engineering projects in the public and private sector to take investment decisions,
- analyze the project risk and understand the concept of ecological limit and economic development,
- calculate depreciation, taxation and its application in analysis and
- identify different financing options and general accounting procedures.

Course Contents:

1. **Basics of Engineering Economics** **(3 hrs)**
   - 1.1. Definition of Economics, Demand, the Law of Demand, Law of Diminishing Utility, Marginal Utility, Supply, Law of Supply, Law of Supply and Demand
   - 1.2. Engineering Economics, Principles of Engineering Economy and its application

2. **Cost Concept and Fundamentals of Cost Accounting** **(3 hrs)**
   - 2.1. Cost Terminology: Manufacturing Cost and Non-Manufacturing Cost
   - 2.2. Cost for Business Decision: Differential Cost and Revenue; Opportunity Cost,Sunk Cost and Marginal Cost

3. **Time Value of Money** **(4 hrs)**
   - 3.1. Interest, Simple Interest, Compound Interest, Nominal Rate of Interest, Effective Rate of Interest
   - 3.2. Economic Equivalence: Present Worth, Future Worth and Annual Worth
   - 3.3. Development of Formulas for Equivalence Calculation

4. **Basic Methods of Engineering Economic Studies** **(7 hrs)**
   - 4.1. Minimum Attractive Rate of Return - MARR
   - 4.2. Payback Period Method – Simple and Discounted
   - 4.3. Equivalent Worth Methods; Present Worth Method, Future Worth Method and Annual Worth Method
   - 4.4. Rate of Return Methods: Internal Rate of Return (IRR) MethodandExternal/Modified Rate of Return(ERR/MIRR) Method
   - 4.5. Benefit Cost Ratio Method

5. **Comparative Analysis of Alternatives** **(6 hrs)**
   - 5.1. Comparing Mutually Exclusive Alternatives having Same useful life by Payback Period Method, Equivalent Worth Method; Rate of Return Methods and Benefit Cost Ratio Method
   - 5.2. Comparing Mutually Exclusive Alternatives having different useful lives byRepeatability Assumption, Co-terminated Assumption, Capitalized Worth Method
   - 5.3. Comparing Mutually Exclusive, Contingent and Independent Projects in Combination.

6. **Risk Analysis** (4 hrs)
   6.1. Origin/Sources of Project Risks.
   6.2. Methods of Describing Project Risks, Sensitivity Analysis, Breakeven Analysis, Scenario Analysis

7. **Ecological Limits and Economic Development** (3 hrs)
   7.1. Economic Theory and Ecological Limit,
   7.2. Concept of sustainable development,
   7.3. Ecological Footprint and
   7.4. Overcoming Ecological Limits

8. **Depreciation and Corporate Income Taxes** (5 hrs)
   8.1. Depreciation and its causes, Asset Depreciation and Accounting Depreciation
   8.2. Basic Methods of Depreciation; Straight line method, Declining Balance Method, Sinking Fund Method, Sum of the Year Digit Method, Unit of Production Method, Modified Accelerated Cost Recovery System (MACRS)
   8.3. Introduction to Corporate Income Tax, Taxation Law, Depreciation Rates Personal Tax, Corporate Tax, VAT
   8.4. After Tax Cash flow Estimate, General Procedure for Making After Tax Economic Analysis

9. **Enterprise Financing and Capital Investment** (5 hrs)
   9.1. Method of Financing: Equity Financing, Debt Financing and Capital Structure
   9.2. Cost of Capital: Cost of Equity, Cost of Debt and calculating cost of capital
   9.3. Project Funding Mechanism: Government budget, Public Private Partnership and Private Investment
   9.4. FIRR, EIRR and Return on Equity

10. **Basic Accounting Procedure** (6 hrs)
   10.1. Accounting Terminologies; Asset and liabilities: Fundamental equation of accounting
   10.2. Financial statements: The Balance Sheet, Income Statement and Cashflow Statements
   10.3. Using Ratios to make Decisions: Debt Ratio, Current Ratio, Quick Ratio – Acid Test Ratio, Inventory Turnover Ratio, Total Asset Turnover, Profit Margin on Sales, Return on Total Assets, Price Earnings Ratio and Book Value per Share

Tutorials:

Two assignments and 1 case study.

Text Book:

1. Chan S. Park. *Contemporary Engineering Economics*. PHI Learning Private Limited.

References:

1. E. Paul De Garmo, William G. Sullivan and James A. Bontadelli. *Engineering Economy*. MC Milan Publishing Company.
2. James L. Riggs, David D.Bedworth and Sabah U. Randhawa.*Engineering Economics*. Tata MCGraw Hill Education Private Limited.
3. N.N. Borish and S. Kaplan.*Economic Analysis for Engineering and Managerial Decision Making*. MC Gran Hill Publishing Company.
4. Adhikari, D.*Principles of Engineering Economic Analysis*.Nepal: Global Publication.
5. SenGupta, Ramprasad.*Ecological Limits and Economic Development*.Oxford University Press.