**University of Management and Technology**

School of Engineering

Department of Electrical Engineering

**Course Outline**

**Course code:** MS 224 **Course title:** Engineering Economics

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| **Program** | BSEE |
| **Credit Hours** | 2 |
| **Duration** | One semester |
| **Prerequisites** | Nil |
| **Resource Person** | Ayesha Iqbal |
| **Counseling Timing**  **(Room# )** | See office window |
| **Contact** | [ayesha.iqbal@umt.edu.pk](mailto:ayesha.iqbal@umt.edu.pk) |

**Chairman/Director signature………………………………….**

**Dean’s signature…………………………… Date………………………………………….**

**Learning Objectives:**

Upon completion of this course, students will:

* Have awareness about the economic and financial considerations involved in engineering projects.
* Have good understanding of Time Value of Money.
* Have working knowledge of basic economic analysis like Present worth, Annual worth, Cost-Benefit, Rate of return, payback period etc.
* Have familiarity with return concept on any particular investment like IRR, ERR etc.
* How engineering projects are initiated, planned, executed, controlled and completed.

The course strongly supports expected outcomes b, c, g and k of the HEC Electrical Engineering Curriculum.

**Learning Methodology:**

Lecture, interactive, participative

**Grade Evaluation Criteria**

Following is the criteria for the distribution of marks to evaluate final grade in a semester.

**Marks Evaluation Marks in percentage**

Quizzes 15

Assignments 5

Mid Term 30

Attendance & Class Participation

Term Project

Presentations

Final exam 50

Total 100

**Recommended Text Book:**

**Engineering Economics Analysis** 9th Edition by Donald Newnan, Ted Eschenbach, Jerome Lavelle, Oxford University Press, 2004.

**Calendar of Course contents to be covered during semester**

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| **Lecture** | **Course Contents** | **Reference Chapter(s)** |
| 1-2 | Concept of Engineering Economy  Role of Engineering Economic Analysis  Decision Making Process | Chapter 1 |
| 3-4 | Basic Principles of Economics  Micro and Macro Economic Theory  Problems of Scarcity | Lecture Slides |
| 5-6 | Economic Environment: Consumer and Producer Goods  Goods and Services  Demand and Supply Concept, Equilibrium  Elasticity of Demand, Elasticity of Supply | Lecture Slides |
| 7-8 | Engineering Costs  Cost Estimation  Benefit Estimation  Cash Flow Diagram | Chapter 2 |
| 9-10 | Computing Cash Flows  Time Value of Money  Simple Interest  Compound Interest | Chapter 3 |
| 11-12 | Repaying a Debt  Equivalence  Single Payment Compound Interest Formulas | Chapter 3 |
| 13-14 | Uniform Series Compound Interest Formulas  Relationships between Compound Interest Factors  Single Payment, Uniform Series, Arithmetic and Geometric Gradient, Nominal and Effective Interest  Continuous Compounding | Chapter 4 |
| 15-16 | **Mid Term Examination** |  |

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| 17-18 | PRESENT WORTH ANALYSIS  Applying Present Worth Techniques  Useful Lives Equal the Analysis Period  Useful Lives Different from Analysis Period  Capitalized Costs | Chapter 5 |
| 19-20 | ANNUAL WORTH ANALYSIS  Annual Cash Flow Calculations and Analysis  Analysis Period  Analysis Period equal to Alternative Lives and a Common Multiple of Alternative Lives | Chapter 6 |
| 21-22 | RATE OF RETURN ANALYSIS  Internal Rate of Return  Calculating Rate of Return  Rate of Return Analysis | Chapter 7 |
| 23-24 | Future Worth Analysis  Benefit-Cost Ratio Analysis  Payback Period  Sensitivity and Breakeven Analysis | Chapter 9 |
| 25-26 | Basic Aspects of Depreciation  Historical Depreciation Methods  Straight-line Depreciation and Declining Balance Depreciation | Chapter 11 |
| 27-28 | Selection of a Minimum Attractive Rate of Return  Sources of Capital  Cost of Funds | Chapter 15 |
| 29-30 | Investment Opportunities  Selecting a Minimum Attractive Rate of Return  Adjusting MARR to Account for Risk and Uncertainty | Chapter 15 |
| 31-32 | **Final Examination** |  |