## 658.159 6 RIG

## CONTENT

## Preface

CHAPTER 1 PROLOGUE : THE SCOPE OF ENGINEERING ECONOMICS	1
Engineering Decision Makers	1
Engineering and Economics	2
Economics : A Capsule View	3
Engineering Economy : A Short History	4
Problem Solving and Decision Making	5
The Engineering Economic Decision Maze	11
Summary	14
Problems	16
Extensions	17

## SECTION ONE MESOECONOMICS

CHAPTER 2 SUPPLY, DEMAND, AND PRODUCTION	23
Supply and Demand	24
Elasticity of Supply and Demand	26
Theory of Production	30
Total, Average, and Marginal Product	32
Allocation of Resources	35
Principles and Practices	38
Summary	38
Problems	40
Extension	43
CHAPTER 3 BREAKVEN ANALYSIS	46
Cost and Competitiveness	46
Breakeven Comparisons	50
Breakeven Charts	51
Linear Breakeven Analysis	54
Nonlinear Breakeven Analysis	60
Applying Breakeven Analysis	66
Summary	67
Problems	70
Extension	76
CHAPTER 4 MINIMUM-COST OPERATIONS	78
Minimum-Cost Solution Methods	79
Cyclic Replacement	80
Time-Cost Trade-Offs	82
Inventory Analysis	87
Vigilance versus Errors	89
Inventory Factors	90
Economic Order Quantity	92
Quantity Discounts	93
Economic Production Quantity	95
Inventory Practices	96
Summary	97
Problems	100
Extension	107

Page

CHAPTER 5 ECONOMIZING AND COMPARING	111
Value Engineering	112
Value-Improvement Programs Comparability	115 123
Productivity	125
Rating Intangible Factors	128
Conditional Decision-Tree Comparisons	133
Mixed-Rating Comparisons Summary	134 136
Problems	140
Extensions	147
SECTION TWO MATHEMATICS OF MONEY	
CHAPTER 6 TIME-VALUE MECHANICS	153
Reasons for Interest	154
Simple Interest Compound Interest	155 156
Time-Value Equivalence	150
Compound-Interest Factors	162
Calculation of Time-Value Equivalents	172
Summary	179
Problems Extension	182 187
	107
CHAPTER 7 EQUIVALENT ANNUAL-WORTH COMPARISON METHOD	190 191
Utilization of the Equivalent Annual-Worth Comparison Method Situations for Equivalent Annual-Worth Comparisons	191
Assets' Lives in Economic Comparisons	200
Use of a shinking Fund	203
Replacement Studies	204
Precautions for Replacement Studies Summary	213 213
Problems	213
Extension	222
CHAPTER 8 PRESENT-WORTH COMPARISONS	223
Utilization of the Present-Worth Comparison Method	224
Situations for Present-Worth Comparisons	224
Classification of Alternatives Valuation	231 234
Cost of Capital	234
Summary	240
Problems Extension	249
	252
CHAPTER 9 RATE-OF-RETURN COMPARISONS Utilization of the Rate-of-Return Method	253 254
Consistency of Comparison Methods	258
RR Comparison of Several Mutually Exclusive Alternatives	262
Comparison of Independent Alternatives	266
RR Irregularities	269
Minimum Attractive Rate of Return Problems	273 279
Extension	285
SECTION THREE MANAGEMENT OF MONEY	
CHAPTER 10 DATA AND SENSITIVITY ANALYSIS	291
Cause-and-Effect Analysis	292

Estimating Techniques	298
Forecasting	304
Forecasts Based on Opinions	306
Forecasts Based on Historical Records	307
Forecasts Based on Cause	318
Sensitivity Analysis	321
Summary	326
Problems	327
Extension	332
CHAPTER 11 DEPRECIATION AND TAX EFFECTS	336
Accounting	337
Depreciation	341
Depreciation Methods	343
Depreciation and Taxes	350
Taxes	352
Corporate Income Taxes	355
After-Tax Economic Comparisons	357
Summary	363
Problems	367
Extensions	373
CHAPTER 12 INDUSTRIAL PRACTICES	380
Sources of Funds	381
Strategic Considerations concerning Funding Sources	382
Inflation and Price Instability	388
The Payback Criterion	392
Decision-making Practices for Industrial Investments	394
Capital Budgeting	406
Summary	412
Problems	415
Extensions	423
CHAPTER 13 ANALYSIS OF PUBLIC PROJECTS	427
Benefit-Cost Analysis	428
Benefit-Cost Comparisons	430
The Discount-Rate Question	437
Benefit and Cost Data	441
Benefit-Cost Applications	446
Summary	451
Problems	454
Extension	460
SECTION FOUR RECOGNITION OF RISK AND UNCERTAINTY CHAPTER 14 ECONOMIC ANALYSES RECOGNIZING RISK	469
Including Risk in Economic Analysis	470
Probability Estimates	472
Probability Concepts	473
Expected Value	483
Investment-Risk Decision Criteria	489
Discounted Decision Trees	492
Risks in Inventory Policy	499
Risks in Maintenance-Replacement Policy	509
Investments to Avoid Risk	511
Summary	514
Problems	517
Extensions	527

CHAPTER 15 PERSPECTIVES FOR DECISION MAKING	538
Noncompetitive Decisions	539
Comparison of Decisions under Certainty, Risk, and Uncertainty	540
Criteria for Noncompetitive Decisions under Uncertainty	541
Evaluation of Decision Criteria	546
Competitive Decisions	549
Game Theory	550
Solution Methods for Mixed-Strategy Zero-Sum Games	552
Nonzero-Sum Games	562
Practicality of Game Theory	564
Summary	564
Problems	565
Extensions	571
APPENDIXES	
A Selected References	581
B Interest Tables	583
INDEX	611