CONTENT

Preface		
1.	 Introduction to Industrial Project Management 1.1 Nature of the Industrial Project 1.2 The Industrial Project manager : The Professional Chemical Engineer 1.3 The Economic Basis of the Industrial Project 	1 2 26 61
2.	 The Mathematics of Finance 2.1 The Measurement of Interest 2.2 The Present Worth of Cash Flows 2.3 Annuties 	77 78 86 100
3.	 Project Evaluation systematics 3.1 Principles of Preliminary project Evaluation 3.2 Marketing Research 3.3 Demand Projection 3.4 Price Projection 3.5 Flow Sheet Development Methods in Cost Estimation 	122 122 126 128 149 152
4.	 Equipment Design and Costing 4.1 Equipment Selection and Sizing for Preliminary cost Estimates 4.2 Estimation of purchased Cost of Equipment 4.3 Effect of inflation upon capital costs 4.4 Cost of Equipment Installation 4.5 Reliability of Equipment Cost Estimation 	187 188 209 223 227 232
5.	 The Direct Fixed Capital Investment 5.1 The Estimation of the Direct Fixed Capital 5.2 The Separate Estimation of Auxiliary Facilities 5.3 The Estimation of Piping Systems 5.4 Reliability of Capital Estimates 	256 257 285 290 311
6.	 Depreciation 6.1 The Economic Impact of Depreciation 6.2 Methods of Determining Depreciation Charges 	334 335 351
7.	 The Cost of Manufacture 7.1 The Elements of the Cost of Manufacture 7.2 Raw Materials and Utilities 7.3 Operating Labor 7.4 Regulated and Fixed Charges 7.5 The Total Cost for Sale 7.6 The Responsibility for Environmental protection 	367 368 374 384 392 397 400
8.	 The Criterion of Economic Performance 8.1 The Capital for Transfer 8.2 Return on Investment 8.3 Profitability under Variable Conditions 8.4 Profitability Criteria Related to ROI 8.5 The Costs of Product Transportation 	421 422 428 435 446 451

9.	Cash Flow Analysis	466
	9.1 Cash Flow concepts	467
	9.2 Net Present Worth	474
	9.3 Discounted Cash Flow	478
	9.4 Relative Merit of Profitability Criteria	494
	9.5 The Analysis of Risk	497
10.	The Analysis of Alternatives	521
	10.1 The Analysis of Equipment Alternatives	522
	10.2 The Analysis of Process and Investment Alternatives	531
	10.3 Economic Optimization	551
	10.4 Replacement Analysis	567
	10.5 Plant Modification Decisions	574
11.	Engineering Management of Construction Projects	595
	11.1 The management of the Process Development Sequence	596
	11.2 Cost Control of Construction Projects	613
	11.3 Time Control of Construction Projects : Scheduling	626
	11.4 Safety and Loss Prevention	642
12.	Corporate Performance Analysis	658
	12.1 Performance Documentation	659
	12.2 Ratio Analysis	667
	12.3 Analysis of Performance of Securities	685
	12.4 Performance of the Chemical Industries	692
Appe	endixes	
A	The Summation of Series using the calculus of finite differences	703
В	The Interconversion of Engineering and Si Units	715
Index	ζ.	719