OPERATIONS RESEARCH

LECTURE NOTES

CONTENTS

Chapter 1. INTRODUCTION TO OR ..... ……..1

1.1 TERMINOLOGY 1

1.2 THE METHODOLOGY OF OR 1

1.3 HISTORY OF OR 2

2. BASIC OR CONCEPTS ..... . ……6

Chapter 2. LINEAR PROGRAMM ING: A geometric Approach 11

2.1 Chapter overview 11

2.1 Maximization Applications 11

3.2 Minimization Appications..... 17

3.3 Homework 23

Chapter 3 **LINEAR PROGRAMM ING: Algebraic Approch**.....27.....

3.1 Chapter Overview 27

3.2 Maximization By The Simplex Method 27

3.3.Minimization By The Simplex Method ……34……

3.4. Homework..... 40

Chapter 4: **DECISION ANALYSIS** 19

4.1 Introduction 46

4.2 The Six Steps in Decision Making 46

4.3 Types of Decision-Making Environments 47

4.4 Decision Making Under Uncertainty 48

4.5 Decision Making Under Risk 51

4.6 Decision Trees 56

4.7 Homework..... 66

Chapter 5 **WAITING LINES AND QUEUING THEORY MODES**..... 72

5.1 Introduction 73

5.2 Waiting Line Costs 73

5.3 Characteristics of a Queuing System 74

5.4 Single-Channel Queuing Model with Poisson Arrivals 79

5.5 Multichannel Queuing Model with Poisson Arrivals 84

5.6 Constant Service Time Model 87

5.7 Finite Population Model (M/M/1 with Finite Source) 89

5.8 Some General Operating Characteristic Relationships 92

.....

5.9 More Complex Queuing Models and the Use of Simulation 92
5.10 Homework

Chapter 6 GAME THEORY MODEL ..... …..104
6.1 Introduction……...104
6.2 Strictly Determined Games.....105
6.3 Non-Strictly Determined Games ……..106
6.4 Reduction by Dominance ……..110
6.5 Homework ……113

Chapter 7 NETWORK MODEL ..... **……120**

7.1 Introduction ……...121
7.2 Minimal-Spanning Tree Problem ……121
7.3 Maximal-Flow Problem ……124
7.4 Shortest-Route Problem……130
7.5 DISCUSSION QUESTIONS AND PROBLEMS……138