

## CONTENTS

SERIES EDITOR'S FOREWORD. . . . .	x1
PREFACE . . . . .	xiii
LIST OF SPECIAL SYMBOLS . . . . .	xv
CHAPTER ONE	
SET THEORY AND SOME TOPOLOGICAL ASPECTS OF EUCLIDEAN TOPOLOGY ON THE REAL LINE . . . . .	1
1.0 Introduction. . . . .	1
1.1 Set Theory. . . . .	2
Exercises . . . . .	15
1.2 Some Topological Aspects of Euclidean Topology on the Real Line - Euclidean n-Space . . . . .	16
Exercises . . . . .	33
1.3 Summary.. . . . .	36
Important Terms in Chapter One. . . . .	37
References and Suggestions for Further Readings. . . . .	38

## CHAPTER TWO

ELEMENTARY MEASURE THEORY, LEBESGUE AND RIEMANN-STIELTJES INTEGRAL . . . . .	39
2.0 Introduction. . . . .	39
2.1 Elementary Measure Theory . . . . .	39
Exercises . . . . .	61
2.2 A Brief Introduction to the Lebesgue Integral. . . . .	62
Exercises . . . . .	88
2.3 The Riemann-Stieltjes Integral. . . . .	90
2.4 Miscellaneous Topics from Analysis. . . . .	92
2.5 Summary . . . . .	95
Important Terms in Chapter Two. . . . .	97
References and Suggestions for Further Readings. . . . .	98

## CHAPTER THREE

PROBABILITY AS AN AXIOMATIC SYSTEM . . . . .	99
3.0 Introduction. . . . .	99
3.1 Probability Spaces and Their Properties . . . . .	99
Exercises . . . . .	111
3.2 Independence and Conditional Probability. . . . .	112
Exercises . . . . .	131
3.3 Completeness. . . . .	131
Exercises . . . . .	133
3.4 Summary . . . . .	135
Important Terms in Chapter Three. . . . .	137
References and Suggestions for Further Readings. . . . .	138

## CHAPTER FOUR

ONE DIMENSIONAL RANDOM VARIABLES . . . . .	139
4.0 Introduction. . . . .	139
4.1 One Dimensional Random Variables. . . . .	139
Exercises . . . . .	148
4.2 Distribution Functions: Continuous and Discrete Random Variables. . . . .	149
4.3 Expectation and Moment Generating Functions . . . . .	171
Exercises . . . . .	201

4.4	Summary . . . . .	203
	Important Terms in Chapter Four . . . . .	207
	References and Suggestions for Further Readings . . . . .	208
CHAPTER FIVE		
	MODES OF CONVERGENCE . . . . .	209
5.0	Introduction . . . . .	209
5.1	Types of Convergence . . . . .	210
5.2	Summary of Relationships Among Various Modes of Convergence . . . . .	227
	Exercises . . . . .	229
5.3	Summary . . . . .	230
	Important Terms in Chapter Five . . . . .	231
	References and Suggestions for Further Readings . . . . .	232
CHAPTER SIX		
	n-DIMENSIONAL RANDOM VARIABLES AND INDEPENDENCE . . . . .	233
6.0	Introduction . . . . .	233
6.1	n-Dimensional Random Variables . . . . .	233
6.2	Independence . . . . .	245
	Exercises . . . . .	260
6.3	Summary . . . . .	264
	Important Terms in Chapter Six . . . . .	266
	References and Suggestions for Further Readings . . . . .	267
CHAPTER SEVEN		
	SOME LIMIT THEOREMS . . . . .	269
7.0	Introduction . . . . .	269
7.1	Limit Theorems . . . . .	270
7.2	The Central Limit Theorem . . . . .	295
7.3	Summary . . . . .	299
	Important Terms in Chapter Seven . . . . .	300
	References and Suggestions for Further Readings . . . . .	301

SOLUTIONS TO SELECTED EXERCISES. . . . .	303
1.1 Exercises. . . . .	303
1.2 Exercises. . . . .	306
2.1 Exercises. . . . .	308
2.2 Exercises. . . . .	309
3.1 Exercises. . . . .	314
3.2 Exercises. . . . .	317
3.3 Exercises. . . . .	319
4.1 Exercises. . . . .	324
4.3 Exercises. . . . .	326
5.2 Exercises. . . . .	330
6.2 Exercises. . . . .	333
INDEX. . . . .	337