

# **INTRODUCTION TO STATISTICS**

Third Edition  
RONALD E. WALPOLE





BSCS-I Naz.  
Roll no:- 6/0 59.

# Introduction to Statistics

**Ronald E. Walpole**

Professor of Mathematics and Statistics, Roanoke College

**SEMINAR LIBRARY**  
Department of Computer Science  
UNIVERSITY OF KARACHI

Macmillan Publishing Co., Inc.



# Contents

## 1

### Introduction

1

- 1.1 Descriptive and Inferential Statistics 2
- 1.2 Populations and Samples 6
- 1.3 Problems for the Statistician 9
- 1.4 Summation Notation 12

## 2

### Statistical Measures of Data

21

- 2.1 Parameters and Statistics 22
- 2.2 Measures of Central Location 23
- 2.3 Measures of Variation 24
- 2.4 Chebyshev's Theorem 39
- 2.5  $z$  Scores 40

## 3

### Statistical Description of Data

47

- 3.1 Frequency Distributions 48
- 3.2 Graphical Representations 53
- 3.3 Symmetry and Skewness 57
- 3.4 Percentiles, Deciles, and Quartiles 61

## 4

## Probability

69

4.1	Sample Space	70
4.2	Events	72
4.3	Operations with Events	74
4.4	Counting Sample Points	82
4.5	Probability of an Event	89
4.6	Additive Rules	93
4.7	Conditional Probability	98
4.8	Multiplicative Rules	102
4.9	Bayes' Rule	108

## 5

Distributions  
of Random  
Variables

115

5.1	Concept of a Random Variable	116
5.2	Discrete Probability Distributions	118
5.3	Continuous Probability Distributions	120
5.4	Joint Probability Distributions	126
5.5	Mean of a Random Variable	133
5.6	Variance of a Random Variable	140
5.7	Properties of the Mean and Variance	145

## 6

Some Discrete  
Probability  
Distributions

155

6.1	Uniform Distribution	156
6.2	Binomial and Multinomial Distributions	157
6.3	Hypergeometric Distribution	167
6.4	Negative Binomial and Geometric Distributions	177
6.5	Poisson Distribution	177

## 7

Normal  
Distribution

183

7.1	Normal Curve	184
7.2	Areas Under the Normal Curve	186