

# **Quantitative Methods in Business**

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## **Chapter 1 What are Statistics and what are their uses?**

### **Objectives**

- Understand where statistics are used
- Understand what constitutes information and data and their distinction
- Appreciate the difference between descriptive and inferential statistics
- Recognise different data types and scales
- Understand how to conduct a statistical investigation
- Understand Sampling Techniques : Simple Random Sampling, Cluster Sampling, Stratified Sampling, Systematic Sampling and Quota Sampling.
- Appreciating the "best" sampling technique for a given problem

## **Chapter 2 Presenting Data**

### **Objectives**

- Understand why we wish to summarise data and how this can be achieved
- Understand how to tabulate data
- Understand how to represent data pictorially
- Be able to draw a dot-plot, bar chart, pie chart, line chart, histogram, and frequency polygon
- Understand what is the most suitable graphical representation
- Be able to draw and interpret a cumulative frequency graph
- Be able to change from relative frequency to frequency and vice-versa
- Understand how some pictorial representations can be misleading

## **Chapter 3: Review of Mathematical Tools**

Cost prices, selling prices,

## **Chapter 4 : Assessing Averages**

### **Objectives**

For each of the three types of data :

- raw data (small number of values)
- discrete data tabulated with a frequency
- continuous data (or grouped data) tabulated with a frequency

the reader should be able to

**Chapter Objectives**

- calculate a central value for a data set : mean; median; mode;
- calculate a value to measure dispersion or spread within a data set
- Be able to interpret what the values for central location and dispersion mean for a data set
- Understand when a particular value for central location is most appropriate

**Chapter 5 : Mathematical Model Building**

Objectives

Building Linear Models

Applications of Quadratics : Profits, Revenue, Cost Functions

**Chapter 6 : Financial Options**

Objectives

- Be able to calculate simple and compound interest and to understand their difference
- Be able to compare monthly interest rates with the effective annual rate
- Be able to compute depreciation (straight line and reducing Balance depreciation)
- Understand the meaning of present and future values
- Be able to compute loan repayments and a loan figure given a regular repayment
- Be able to compute the value of a savings plan on maturity
- Understand how to compute a pension income given a life expectancy

**Chapter 7: What's the chance**

Objectives

- Understand the concepts of probability and conditional probability:
- Be able to use and interpret a Venn diagram and a tree diagram;
- Understand the notion of Expected Value
- Use the Discrete Probability Models : Binomial and Poisson

**Chapter 8 : What's the Chance and what's the evidence**

Objectives

- Be able to use the Normal probability Model
- Understand when to use an approximation to a probability model
- Be able to use approximations to probability models to ease calculations
- Understand the concept of sampling distribution
- Be able to use Minitab to generate a sampling distribution of the mean
- Be able to test a claim about the average of some population using a Z or t test.

## **Chapter 9 : Spotting Relationships - Correlation and Regression**

### Objectives

- Understanding linear association between two attributes
- Understanding the most appropriate measures of linear correlation
- Be able to compute appropriate measures of linear correlation
- Understanding how to measure a linear relationship between two variables
- Be able to compute an equation of linear regression
- Understand interpolation and extrapolation
- Be able to interpret a Minitab printout for linear regression

## **Chapter 10 : Changes over Time : Index Numbers & Time Series**

### Objectives

- Understanding changes of attributes over time;
- Understanding how to compute indices to measure changes over time;
- Understanding the most appropriate index for a given situation;
- Understand how the retail prices index is computed;
- Understanding how to use a sequence of data measured at successive points in time;
- Understand the key features of a time series;
- Be able to generate forecasts and projections;

## **Chapter 11 Making Decisions - What's the Best Mix : Linear Programming**

### Objectives

- Be able to formulate a linear programming problem
- Be able to graphically solve the linear programming problem
- Have an understanding of the simplex algorithm

## **Chapter 12 : Project Planning Decisions - what's the best time/cost**

### Objectives

- be able to draw a network to represent a project
- be able to calculate the cost and duration of a project
- be able to determine which activities are critical to the on-time completion of this project
- determine whether or not a project duration can be reduced
- be able to reduce the project time where appropriate
- be able to draw and interpret a Gantt chart

## **Appendices**

Answers to Odd –Numbered questions

Statistical Tables - Normal, t-distribution, Critical values for the Product Moment correlation coefficient, and Spearman's rank correlation coefficient.

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