

**NEW ZEALAND INSTITUTES OF TECHNOLOGY AND POLYTECHNIC
QUALIFICATIONS IN INFORMATION & COMMUNICATIONS TECHNOLOGY**

PRESCRIPTION: ST500 STATISTICAL ANALYSIS

AIM OF MODULE:	To enable students to gain an understanding of basic statistical principles and practice as needed by a non-statistician in a business environment.
CREDITS:	7
STUDENT LEARNING HOURS:	70
CONTENT REVISED:	Pre 1996
PRESCRIPTION EXPIRY DATE:	November 2013

Level and Assessment Schedule

TOPICS	Highest Skill Level				Suggested Assessment Percentage
	R	C	A	P	
1. Single Variables			*		20
2. Relationships in Two or more variables			*		20
3. Series Variables			*		20
4. Sampling and Data Quality		*			20
5. Current Developments in Data Analysis			*		15
6. Overview of Software and Its Role		*			5
					100

The student will:

1 SINGLE VARIABLES

- C 1.1 Classify variables as qualitative, coded, counted, measured.
- A 1.2 Use pencil-and-paper and software to produce one-variable graphics such as:
- dotplot
 - histogram
 - box plot
- C 1.3 Describe the features of a distribution as revealed by these plots: number of subgroups, behaviour at extremes, skewness.
- A 1.4 Use software to find the summary statistics, and interpret these.

2 RELATIONSHIPS IN TWO AND MORE VARIABLES

- A 2.1 Use software to produce the two- and more- variable graphics such as:
- scatterplot
 - letterplot
 - multiple box plot
 - scatterplot matrix
- C 2.2 Describe the features of a relationship as revealed by these plots: number of subgroups, outliers, functional relationships, patterns in the spread.
- A 2.3 Use regression software to fit functions to data, find and plot residuals, and calculate r^2 and r .
- C 2.4 Assess the appropriateness of these fits, and interpret the statistics.
- A 2.5 Use software to make two-way frequency tables.

3 SERIES VARIABLES

- A 3.1 Use software to produce series plots.
- C 3.2 Describe the features of the series revealed in the plots: trends, cycles, seasonal effects, residuals.

NOTE TO TUTORS

- PC-INFOS dataset and software from the Department of Statistics would be useful here.

- A 3.3 Use software to do series transformations such as smoothing and deflating.
- R 3.4 Explain what forecasting aims to do, how it is used in budgeting, and some of its pitfalls.

4 SAMPLING AND DATA QUALITY

- R 4.1 List the sources of data (experiment, survey (census or sample), or administrative records).
- R 4.2 Explain the ways in which errors can arise in statistical data, and the methods of maintaining data quality.
- C 4.3 Explain the advantages and disadvantages of random sampling.
- C 4.4 Explain how estimates from random samples have a sampling error which is measured by their standard error, and apply this to market research surveys.
- R 4.5 Describe the techniques used for sampling business transactions such as:
 - invoices
 - credit notes
 - cheques paid
 - cash received
 - journal entries
- C 4.6 Explain the difference between the results of studies involving:
 - random samples
 - population or non-random samples.

5 CURRENT DEVELOPMENTS IN DATA ANALYSIS

- A 5.1 Use the "business graphics" feature of some common packages, and assess their usefulness as tools for graphical statistical data exploration.
- A 5.2 State some principles for Quality in Data Graphics, and apply these to data graphics from packages and from newspapers, magazines and television.
- C 5.3 Outline current developments in computer tools for statistics, such as interactive data graphics and statistical expert systems.
- C 5.4 Outline the computer-based methods used by the Department of Statistics for publishing official statistics (INFOS & press releases, PC-INFOS on floppy disks, fax, etc.).

6 OVERVIEW OF SOFTWARE

- C Discuss the range of statistical software available and its role in modern business.

NOTE

- The use of simple graphics software is **STRONGLY** recommended. Students should then report on what the data says. Students should **NOT** spend time calculating or diagramming by hand.

SUGGESTED TEXT

- A book of tutor notes is available from Wellington Polytechnic on paper, DG tape or MS-DOS floppy disk. 30 exercises with Minitab are also available.

OTHER RESOURCES:

- Data - "The Data Bundle" from NZ Statistics Association, Box 1731, Wellington

Software - Data General: Minitab

- MS-DOS: Minitab (*)
Dept. of Statistics PC-INFOS (*)
Professional packages such as Statgraphics, Systat etc.
- Apple Mac: Data Desk Professional

(*) Recommended as being the most useful at present.