
PRESCRIPTION: 430 QUANTITATIVE BUSINESS METHODS

This prescription replaces *160 Quantitative Business Methods*.

ELECTIVE PRESCRIPTION

LEVEL	4
CREDIT	20
VERSION	1
INTRODUCED	2006
AIM	Students will demonstrate knowledge of the concepts and methods of data analysis, statistical inference and financial mathematics.
PREREQUISITES	Nil

ASSESSMENT WEIGHTINGS

Learning outcomes	Assessment weighting %
1. Students will identify data types, calculate and compare statistical measures, present the data in graphical formats using computer software and comment on features.	15
2. Students will use methods of correlation and regression to analyse a given data set, and interpret the results.	15
3. Students will plot time series, identify their features, then produce and explain forecasts using computer software.	15
4. Students will describe sampling techniques and errors, use simple and one other random sampling technique to select samples.	10
5. Students will describe the Consumer Price Index (CPI), compare single commodity index series, and deflate financial time series.	10
6. Students will apply financial mathematics.	10
7. Students will apply probability distributions, find and interpret confidence intervals for population means and proportions.	15
8. Students will discuss the use of statistics as it relates to quality control, create and interpret control charts.	10
TOTAL	100

All learning outcomes must be evidenced; a 10% aggregate variance is allowed.

ASSESSMENT NOTES

1. Assessment materials should reflect relevant and current legislation, standards, regulations and acknowledged good industry/business practices.
2. The size of the data sets has not been specified as this is at the discretion of the assessment designer.
3. Computer software must be used for assessing learning outcomes one and three. The use of computer software for assessment of the other learning outcomes is at the discretion of the assessment designer.
4. Learning outcome one, key element c) 'graph excellence' is to focus on the appropriate graph type, labelling and use. Two dimensional frequency tables are the same as contingency tables or cross tabulations; any of these terms can be used.
5. Learning outcome two, key element b) includes spurious correlation. Key element d) includes the assessment of slopes, intercepts and plotting curves. The use of the regression line to obtain prediction for a dependent variable is covered in key element d).
6. Learning outcome seven includes confidence intervals, however the Central Limit Theorem and the difference between point and interval estimates are outside the assessment requirements for this learning outcome.
7. Learning outcome eight requires that students produce control charts and interpret the warning indicators.

LEARNING OUTCOME ONE

Students will identify data types, calculate and compare statistical measures, present the data in graphical formats using computer software and comment on features.

Key elements

- a) Data types:
 - categorical
 - numerical:
 - continuous
 - discrete.
- b) Statistical measures:
 - mean
 - median
 - mode
 - quartiles
 - range
 - inter-quartile range
 - standard deviation.
- c) Graphical formats using computer software:
 - graph types:
 - two dimensional frequency table
 - histogram
 - box plot
 - column/bar.
 - graph excellence:

- type
 - labelling
 - use.
- d) Features:
- shape/skewness
 - outliers.

LEARNING OUTCOME TWO

Students will use methods of correlation and regression to analyse a given data set, and interpret the results.

Key elements

- a) Scatter plot.
- b) Correlation coefficient:
- value:
 - interpretation.
- c) Coefficient of determination:
- value:
 - interpretation.
- d) linear regression:
- equation
 - equation coefficients:
 - interpretation.
 - y and \hat{y} :
 - reliability of \hat{y}
 - interpretation of $y - \hat{y}$.

LEARNING OUTCOME THREE

Students will plot time series, identify their features, then produce and explain forecasts using computer software.

Key elements

- a) Plots and features:
- components:
 - trend
 - seasonal
 - cyclical
 - irregular.
 - time series models:
 - additive
 - multiplicative.

- b) Forecasts:
 - trend component:
 - moving averages.
 - seasonal component:
 - indices
 - adjustment.

LEARNING OUTCOME FOUR

Students will describe sampling techniques and errors, use simple and one other random sampling technique to select samples.

Key elements

- a) Sampling and non-sampling errors.
- b) Sampling techniques:
 - random sampling:
 - simple
 - systematic
 - stratified
 - cluster.
 - non-random sampling:
 - judgment
 - quota
 - convenience
 - self selection.

LEARNING OUTCOME FIVE

Students will describe the Consumer Price Index (CPI), compare single commodity index series, and deflate financial time series.

Key elements

- a) CPI, three of:
 - selection process
 - base weights
 - commodity groups
 - review/updated
 - Laspeyres index.
- b) Single commodity:
 - calculation
 - comparison including change of base.
- c) Financial time series for deflation may include but not limited to:
 - salary or wages
 - value of exports
 - retail sales

- other.

LEARNING OUTCOME SIX

Students will apply financial mathematics.

Key elements

- a) Simple and compound interest for lump sum amounts:
 - Present Value
 - Future Value
 - nominal and effective interest rates.
- b) Simple ordinary annuities:
 - Present Value
 - Future Value
 - payment.

LEARNING OUTCOME SEVEN

Students will apply probability distributions, find and interpret confidence intervals for population means and proportions.

Key elements

- a) Probability distributions:
 - normal distribution:
 - probabilities
 - inverse probabilities
 - t-distribution:
 - table values.
- b) Confidence interval for population mean:
 - assessing a claim
 - sample size calculation
 - 'margin of error'.
- c) Confidence interval for population proportion:
 - assessing a claim
 - sample size calculation
 - 'margin of error'.

LEARNING OUTCOME EIGHT

Students will discuss the use of statistics as it relates to quality control, create and interpret control charts.

Key elements

a) Process variation:

- controlled
- uncontrolled.

b) Control charts:

- mean control chart:
 - control limits
 - out of control indicators.
- range or standard deviation control chart:
 - control limits
 - out of control indicators.