The University of Southern Queensland

Course Specification

Description: Uniprep Mathematics Communication Level B

<table>
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<tr>
<th>Subject</th>
<th>Cat-Nbr</th>
<th>Class</th>
<th>Term</th>
<th>Mode</th>
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<td>1, 2003</td>
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Academic Group: OPACS
Academic Org: OPACSP
HECS Band: 2
ASCED Code: 010199

STAFFING
Examiner: Linda Galligan
Moderator: Janet Taylor

RATIONALE
Students considering entry into Bachelor of Business, Bachelor of Commerce and Bachelor of Information Technology (Software Development or IT Management) require mathematical knowledge and skills if they are to be successful in their chosen field of study. Students need to master, practise and refine these mathematical skills as a prerequisite to success at tertiary level. Students also need to develop and practise language and problem solving skills in English so that they can build upon their existing knowledge and express themselves adequately in the mathematical context. This course is designed to allow students to appreciate the diverse applications and power of mathematics; the precise language and structure of mathematics; and to develop confidence and reduce anxiety by using mathematics skills in a variety of problem solving sessions.

SYNOPSIS
There are two compulsory parts of the course. Part A consists of mastery of the content of selected topics within arithmetic, algebra, measurement, trigonometry, graphing, statistics and probability. Students are also expected to show competence in communicating using mathematical language in English. Part B consists of group work designed to develop the mathematical communication and problem solving skills of students. This work utilises the content mastered in Part A of the course.

OBJECTIVES
On successful completion of this course students will be able to:

- OBJECTIVES PART A
- Modules 1A, 1B, 1C
- Manipulate and perform operations on numbers in the real number system including positive and negative integers, fractions and decimals.
- Calculate percentages and ratios, including ratios in triangles.
- Perform operations on powers with positive, negative, zero and fractional indices.
- Find perimeters, areas and volume of basic geometric figures.
- Use scientific notation and correct units of the metric system.
- Perform operations on numbers expressed in scientific notation.
- Convert between units of the metric system.
- Convert between scientific and ordinary notation.
- Modules 2A, 2B, 2C, 2D
- Plot points on a Cartesian plan.
- Identify co-efficients, variables and constant terms in expressions.
- Interpret the meaning of algebraic equations.
- Simplify expressions involving algebraic symbols.
- Expand and factorise algebraic expressions.
- Use Sigma notation.
- Rearrange algebraic formulae.
- Solve linear equations.
- Solve simultaneous equations.
- Develop equations for practical problems and solve them.
- Understand the mathematical concept of function.
- Find the domains and ranges of simple algebraic functions.
- Understand functions described by tables, graphs and formulae.
- Recognise linear functions and use them to solve problems.
- Describe the properties of quadratic functions.
- Factorise quadratic expressions.
- Solve quadratic equations by factoring or using the formula.
- Recognise polynomial functions of degree higher than two.
- Understand the relationship between a function and its inverse.
- Modules 3A, 3B
- Identify and draw the graphs of linear, parabolic, exponential and logarithmic equations.
- Predict the effect on the graphs of these equations when constants and co-efficients are changed.
- Use graphs to solve simultaneous equations.
- Describe the pattern of exponential growth and recognize its occurrence in practical situations.
- State the properties of exponential functions and explain these using the index laws.
- Model problems involving growth and decay using the exponential function with positive and negative integer and fractional indices.
- Solve growth and decay problems graphically.
- Solve problems involving simple and compound interest.
- Describe the relationship between exponential and logarithmic functions.
- Model and solve practical problems involving exponential and logarithmic functions, both graphically and by using inverse functions.
- Modules 4A, 4B, 4C
Define and give examples of population, sample, parameter, statistic, variable and randomness.

Demonstrate an understanding of the methods of collection of data.

Critically examine procedures used in the collection of data.

Use a random number table and a calculator to select a sample.

Differentiate between discrete and continuous variables.

Classify data according to type.

Construct and interpret stem-and-leaf plots.

Construct and interpret frequency distributions and histograms for grouped and ungrouped data.

Construct and interpret bar charts and pie charts.

Calculate the mean and mode of grouped and ungrouped data.

Calculate the median of ungrouped data.

Construct and interpret scatter plots.

Fit a line of best fit, by eye, to a scatter plot.

Make predictions using scatter plots.

Demonstrate understanding of the variability and centrality of data.

Find the range and deviations about the arithmetic average of a data set.

Define experiment, element, sample space, complementary event.

Use the elementary rules of probability.

Construct tree diagrams.

Find empirical probabilities for various situations.

Define and calculate permutations and combinations.

Use the calculator to find factorials.

Understand quantiles.

Find five-number summaries of data sets.

Construct and interpret box-and-whisker plots.

Find the interquartile range, mean absolute deviation, standard deviation, variance and co-efficient of variation of a data set.

Perform statistical computations on a calculator in the statistics mode.

OBJECTIVES PART B

Read tables and graphs from a variety of sources.

Draw and interpret graphs from a variety of sources.

Use arithmetic and statistical calculations in problem solving situations.

Use a calculator efficiently.

Use and develop formulae.

Communication confidently in English in pairs and small groups.

Present results from class work and assignments to whole class.

Groups read, speak and ask questions in class in English impromptu.

Write sentences and paragraphs in class on class-related activities.

Write prepared sentences, paragraphs and report on class-related activities.

TOPICS

Description | Weighting (%)
--- | ---
1. Arithmetic (Modules 1A, 1B, 1C) | 10.00
2. Algebra (Modules 2A, 2B, 2C, 2D) 20.00
3. Graphing (Modules 3A, 3B) 40.00
4. Statistics and Probability (Modules 4A, 4B, 4C) 30.00

TEXT and MATERIALS required to be PURCHASED or ACCESSED:
Books can be ordered by fax or telephone. For costs and further details use the 'Book Search' facility at http://bookshop.usq.edu.au by entering the author or title of the text.
2001, Mathematics Communication Level A/B Book 2, USQ,
2001, Mathematics Communication Level B Book 3, USQ,
Students are expected to have a bi-variate scientific calculator.

STUDENT WORKLOAD REQUIREMENTS

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<th>ACTIVITY</th>
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<tr>
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OTHER REQUIREMENTS

1. Students are not eligible to pass this course if they have not demonstrated mastery of all the required modules and if they have not attended at least 80% of the mathematics communications group work sessions.

2. Assignments submitted after the due date without an approved extension of time will have a 5% reduction in marks per day.

3. Items of assessment must be submitted to the satisfaction of the lecturer before a pass grade will be awarded.

4. The total score for all summative items of assessment must be at a minimum of 55% to gain a pass mark for the course.

5. Additional Notes: 1 Part A is predominantly a self paced course. Students work sequentially through the modules they are required to master at their own pace, completing this part of the work by the end of the term. Mastery of a module is demonstrated by the student taking appropriate tests before proceeding with study of another module. Mastery of Modules 1A, 1B and 2A, 2B can be shown by listening to a tape based on these modules and completing a revision test. Students not completing this test satisfactorily will be required to complete the appropriate module quizzes. 2 Part B consists of different activities each week. Students must participate actively in the group work of the problem solving sessions. Students also must submit written work as required.