The University of Southern Queensland
Course Specification

<table>
<thead>
<tr>
<th>Description: Mathematics Tertiary Preparation Level C</th>
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<tr>
<td>Subject</td>
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<td>TPP</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 who intend to enrol in Science (other than Psychology), Bachelor of Technology and Associate Degrees of Engineering, Surveying, Mathematics and Computing, will be required to complete this course. This preparatory mathematics course is designed to provide students with the basic mathematical competencies for these tertiary studies.

SYNOPSIS
Using the concepts of self-paced instruction and mastery learning, the course guides students through a carefully sequenced series of topics which will provide the foundation for understanding the mathematics that will be encountered in their tertiary study. The self-paced structure of the course allows students to work through the material at a pace suitable to their needs, permitting them to work quickly through familiar material, as well as allowing the opportunity to seek additional assistance in areas of uncertainty. The mastery approach will ensure that they successfully achieve the objectives of each topic before progressing to the next topic, which will build further on the earlier material.

OBJECTIVES
On successful completion of this unit a student should be able to:

- MODULE 1 Managing Mathematics Level C
- Reflect on your attitude to mathematics;
- Study mathematics more effectively;
- Develop an action plan around the structure of the materials;
- Formulate a study schedule;
- MODULE 2 Do You Understand This?
- Revise the required prerequisite content for this unit and
• Understand the importance of the following:
• Index laws;
• Algebraic expressions;
• Solving linear, quadratic, exponential & logarithmic equations;
• Graphing straight lines, parabolas, exponentials and logarithms
• Trigonometrical ratios and functions;
• Matrices.
• Practice using the graphing package;
• MODULE 3 Relations and Functions
• Demonstrate an understanding of the concept of a function;
• Demonstrate an understanding of the concept of continuity;
• Use functional notation;
• Recognise, sketch and use polynomial, exponential, and logarithmic functions;
• Demonstrate an understanding of the inverse of polynomial, exponential, and logarithmic function;
• Recognize relations that are not functions;
• Investigate functions over the integer domain - Sequences and series;
• Understand the concept of limit;
• Recognize convergent and divergent sequences and functions;
• Find the sums of series;
• MODULE 4 Trigonometrical Functions
• Demonstrate an understanding of the concept of radian measurement;
• Convert from degrees to radians and vise versa;
• Use radian measure in various applications;
• Define and calculate trigonometric ratios for any angle;
• Describe and sketch trigonometric functions of sine, cosine and tangent;
• Calculate the amplitude, vertical shift, period and phase of a function from its equation and graph;
• Understand the nature of inverse trigonometric functions and solve trigonometric equations using trigonometric identities;
• MODULE 5 Analytical Geometry - Representing Points and Curves
• Identify points using rectangular coordinates, polar coordinates, and vectors;
• Change from polar to rectangular coordinates and vise versa;
• Demonstrate an understanding of a vector;
• Express vectors in terms of column matrix and i and j;
• Identify characteristics of straight line segments including equation, distance and mid-point;
• Identify characteristics of standard curves (polynomial, exponential, logarithmic, circular, and hyperbolas);
• Examine transformations of linear, parabolic, exponential, logarithmic, circular curves and rectangular hyperbolas; and examine other curves and investigate the importance of
• parameters in their equations.
• MODULE 6 Describing Change - An Introduction to Differential Calculus
• Use graphs and algebra to describe the rate of change of a function;
• Determine the instantaneous rate of change of a function;
• Apply the power, sum and difference rules to find the derivative of certain polynomial functions;
• Apply calculus to velocity and acceleration and other real life problems;
• Use gradient functions to determine the derivatives of trigonometric, exponential and logarithmic functions;
• Locate local stationary points of a function; and
• Solve optimization problems.
• MODULE 7: Total Change - An Introduction to Integral Calculus
• Find areas using various geometric methods;
• Find areas under curves using definite integrals;
• Demonstrate an understanding of the relationship between Differentiation and integration;
• Find indefinite integrals;
• Apply calculus to various practical situations.

TOPICS

<table>
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<tr>
<th>Description</th>
<th>Weighting (%)</th>
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<td>Revision topics- Do you understand this?</td>
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<td>Relations and Functions</td>
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<td>Trigonometric Functions</td>
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<tr>
<td>Analytical geometry - representing points and curves</td>
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<tr>
<td>Total change - An introduction to integral calculus</td>
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**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.

Scientific calculator. Students need access to a computer.
## ASSESSMENT DETAILS

<table>
<thead>
<tr>
<th>Description</th>
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<th>Wtg(%)</th>
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<td>ASSIGNMENT 3</td>
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<td>END OF SEMESTER EXAM - 3</td>
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<td>HOURS</td>
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### NOTES:

1. Further details about the due dates are detailed in the assessment section of the Course Specifications.
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### OTHER REQUIREMENTS

1. Normally, to gain a passing grade, students must submit ALL assignments before the exam period and obtain a satisfactory result in each assessment item. Students who are unable to meet these requirements and who wish to apply for special consideration are required to apply in writing to the Course Team Leader prior to the examination. In these cases students may be granted a supplementary examination or assignments as appropriate.

2. Students may be required to submit extra work for each assignment which is deemed unsatisfactory.
The time it will take to complete this mathematics course will vary and will depend on the student's background and experiences; times indicated above are a guideline only.