



Wollongong College Australia

A College of the University of Wollongong

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Foundation Studies Program

(CRICOS course codes: 007732G, 023266F)

Subject Outline Summer 2009/10

FSP 216 Mathematics 2

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WCA-FSP 216-S0/3

Mathematics

Subject description

The main emphasis in Mathematics 2 is on introductory calculus.

Algebraic techniques are extended to solving equations with absolute values and solving inequalities. Graphs of functions are studied in further depth including graphs of functions involving absolute values, and sketching of non linear functions. Quadratic functions are studied in greater depth than in 1st session.

A major component of second session is the introduction and development of techniques of calculus. Differentiation and integration of general polynomial functions are covered as well as applications of both.

Subject structure

Mathematics is an 8 credit point, two-session subject delivered as 4 hours of scheduled classes per week. Both Session 1 and Session 2 are valued at 4 credit points. The subject consists of a 1 x 2 hour lecture and 1 x 2 hour tutorial each week. Each session is of 14 week's duration with face-to-face classes scheduled for the first 12 weeks and a study/examination period in Weeks 13 and 14.

In addition to scheduled class sessions, students are expected to spend additional time in individual study and research. As a general guideline students will need to spend at least 1 hour in private study (including completing homework and revision) for every hour of scheduled class time. Students with a weak mathematics background may need to spend considerably more time in private study in order to obtain a satisfactory grade in the subject.

Teachers will be available for a consultation time each week. Students will be notified of the time and location of the consultation session during Week 1 of the Session. It is recommended that students experiencing difficulty with this subject arrange to consult with the teacher as difficulties are encountered.

Some students may require tutorial support to improve language/literacy skills. Where this is recommended, students will be advised to use the College's self-access facilities in the Multimedia Centre in their own time. These facilities are located upstairs in building 30. Where this is recommended, your attendance at and use of these facilities may form part of your participation mark.

Learning resources

Students will be required to purchase the following text for this subject:

3 Unit Mathematics Book 1 by S.B. Jones and K.E. Couchman ISBN: 0-582-81053-1

Calculators

Students will be required to bring a scientific calculator to all classes. Students who need to purchase a calculator for this subject are strongly recommended to purchase a Casio FX-82 series (approximately \$25 – \$40) calculator.

Only approved scientific calculators will be permitted in exams. The list of approved calculators is located on the college website (www.wca.uow.edu.au). Students should refer to this list to confirm their calculator has been approved for use in exams.

Programmable calculators are not permitted. Programmable calculators usually have a RUN, EXE, CALC or SOLVE button.

Subject outcomes

Successful completion of Mathematics 2 will enable students to:

- ▶ demonstrate a working knowledge of the basic skills of algebra and co-ordinate geometry.
- ▶ solve linear and quadratic equations.
- ▶ solve linear and quadratic inequalities.
- ▶ solve simultaneous equations.
- ▶ solve systems of equations using matrix algebra.
- ▶ sketch functions including circular, hyperbolic and logarithmic functions.
- ▶ construct and analyse equations of linear functions.
- ▶ demonstrate a working knowledge of differential and integral calculus and their applications.

Subject outline in weeks

The following guide to lessons and activities may be adjusted to suit the needs of the group as long as subject outcomes and assessment criteria are met.

Week 1

Interpret absolute values.

Solve equations involving absolute values.

Solve inequalities.

Solve inequalities with absolute values.

Week 2

Use function notation. Interpret range and domain of functions.

Draw graphs of hyperbolic and circular functions.

Determine the equation of a circle from its radius and centre.

Week 3

Sketch quadratic functions with 2 roots, 1 root and no real roots.

Solve quadratic inequalities.

Calculate and interpret the discriminant.

Determine the maximum and minimum value of quadratic functions.

Week 4

Evaluate limits.

Differentiate simple polynomials from first principles.

Week 5

Use rules of differentiation with respect to general polynomials.

Week 6

Use product, quotient and function of a function rule to differentiate functions.

Week 7

Mid-session test

The usual tutorial will be presented as a combined lecture/tutorial.

Determine gradient of a tangent to a curve by differentiation, and hence find the equation of a tangent or normal.

Week 8

Use differentiation to determine the coordinates and nature of turning points.
Solve problems on maxima and minima.

Week 9

Find the primitive function of x^n

Week 10

Evaluate definite integrals.

Evaluate the area under a curve.

Week 11

Manipulate matrices by addition, subtraction and scalar multiplication.

Use matrices to solve problems.

Week 12

Revision

Weeks 13 & 14 Final examination Period

Final examination and study period. Please refer to examination timetable for the exact date, time and location of the final exam.

FSP 216 Mathematics 2 Week 1-12 Tutorial/Homework Schedule

The exercises listed are contained in the textbook *3 Unit Mathematics Book 1*.

Week 1	<p>Section 1: Review of Algebra</p> <p>1.1 Equations</p> <p>Absolute values</p> <p>Solving equations with absolute values</p> <p>Solving inequalities</p> <p>Solving inequalities with absolute values</p>	<p>Ex 4.3</p> <p>Ex 4.4</p> <p>Ex 4.11, Ex 4.12</p> <p>Ex 4.13</p>
Week 2	<p>1.2 Functions</p> <p>Function notation.</p> <p>Domain and range.</p> <p>Graphs of hyperbolic functions</p> <p>Graphs of absolute values</p> <p>Circles</p>	<p>Ex 7.1</p> <p>Ex 7.2</p> <p>Ex 7.4</p> <p>Ex 7.5</p> <p>Ex 7.7, Ex 17.3</p>
Week 3	<p>1.3 Quadratic Polynomial</p> <p>Graphs of quadratic functions</p> <p>Solution of quadratic inequalities</p> <p>Quadratic equations and the discriminant</p> <p>Maximum or minimum value of quadratic functions</p>	<p>Ex 15.1, Supplementary Notes</p> <p>Ex 15.2</p> <p>Ex 15.3, Ex 15.4</p> <p>Ex 15.7</p>
Week 4	<p>Section 2: Calculus</p> <p>2.1 Limits</p> <p>Finite Limits and Infinite Limits</p> <p>2.2 Differentiation</p> <p>From first principles</p>	<p>Ex 11.9, Ex 11.10</p> <p>Ex 11.2</p>
Week 5	Using rules of differentiation	Ex 11.3, Ex 11.4, Ex 12.4
Week 6	<p>Product and quotient</p> <p>Function of a function</p> <p>Further examples</p>	<p>Ex 12.1, Ex 12.2</p> <p>Ex 12.3, Ex 12.5</p> <p>Ex 12.6</p>
Week 7	<p>Midsession Test.</p> <p>Equations of tangents and normals</p>	Ex 11.5, Ex 12.1- 12.4, Ex 12.6
Week 8	<p>Maximum and minimum turning points</p> <p>Applications of maxima and minima</p>	<p>Ex 11.6, Ex 11.7</p> <p>Ex 11.8</p>
Week 9	<p>2.3 Integration</p> <p>Integration of polynomial functions</p>	Ex 18.3, Ex 18.4
Week 10	<p>Definite Integrals</p> <p>Applications</p>	<p>Ex 18.5</p> <p>Ex 18.6</p>
Week 11	Section 3: Linear Algebra	Supplementary Notes
Week 12	Revision	To be supplied

Assessment

Assessment and plagiarism policy

All written assessment tasks, with the exception of examinations and in-class tasks, must be word-processed unless students are otherwise advised.

Students must keep copies of all assessment tasks submitted for marking with the exception of class tests and examinations.

Plagiarism is a form of cheating or stealing that happens when a student uses someone else's work and presents it as his/her own without showing where it comes from. To avoid this, students are expected to submit their own original work for assessment and to accurately acknowledge all references and sources used in essays and assignments.

For information regarding assessment, plagiarism, acknowledging sources and examination rules, please refer to the Wollongong College Australia Student Handbook <http://www.wca.uow.edu.au/handbook>

Assessment schedule

Task	Due	Weighting	Length/Time
Quizzes	Weeks 4, 9 & 12	15%	10-15 minutes
Mid-session test	Week 7	30%	1 hour
Final Examination	Week 13/14	50%	2 hours
Participation	Ongoing	5%	Weeks 1-12

Marking Guidelines

WCA best practice is that students can normally expect to have assessment tasks handed back within two weeks, and before the next assessment task is due. On occasion there may be exceptions to this time frame due to, for example, the size of the task, the size of the class, teacher illness or teacher leave.

Where there are several teachers marking a major assessment task, tasks will be handed back by all the teachers within the same week.

Assessment criteria and explanation of components

All assessment components are marked according to set marking criteria.

Quizzes **15%**

During session three quizzes will be given during tutorial times. These quizzes will be informal assessment tasks of approximately 10 - 15 minutes duration, and will cover only one or two topics from preceding weeks. Quizzes will be held in weeks 4, 9 & 12.

Mid-Session Test **30%**

The mid-session test will be held in week 7. This test will cover the material covered in weeks 1 – 5 of this session.

Final Examination **50%**

The final examination will be held during the formal examination period in weeks 13 and 14, and will examine all topics covered during this session.

Participation **5%**

Active participation in tutorials is expected of all students in all classes. Participation in class discussions will help develop the student's confidence in questioning and commenting on material presented, encourage critical thinking and allow the tutor to evaluate the student's progress.

Participation marks may be allocated according to the following criteria:

- ▶ Active participation in tutorial support classes where recommended
- ▶ Recording answers to tutorial exercises in designated tutorial exercise book.
- ▶ Bringing tutorial exercise book to all classes.

- ▶ Active participation in class discussions and group work
- ▶ Proactive consultation with class teacher and/or tutorial support where relevant
- ▶ Completion of non-assessable tasks including homework and practice tasks
- ▶ Preparation for teacher-student consultation sessions