



Wollongong College Australia

A College of the University of Wollongong

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ITC Education Ltd trading as
Wollongong College Australia
CRICOS 02723D
ABN 14105312329

Foundation Studies Program

(CRICOS course codes: 007732G, 023266F)

Subject Outline Summer 2009/10

FSP 218

Advanced Mathematics 2

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WCA-FSP 218-S0/4

Advanced Mathematics

Subject description

The sequence of subjects Advanced Mathematics 1 and 2 provides a minimal content of mathematics for students entering Wollongong University degree courses in Mathematics, Engineering, Science or IT.

Subject structure

Advanced Mathematics is a 16 credit point, two-session subject delivered as 8 hours of scheduled classes per week. Both Session 1 and Session 2 are valued at 8 credit points. The subject consists of a 2 x 2 hour lectures and 2 x 2 hour tutorials 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.

Progression from FSP 118 to FSP 218

Advanced Mathematics 1 is a prerequisite for Advanced Mathematics 2.

Students who achieve a result of 50% or higher in FSP 118 will automatically progress to FSP 218, provided all other progression requirements are met.

Students who satisfy all other progression requirements but achieve a result between 46% and 49% for FSP 118 will be required to 'show cause' before they can attempt FSP 218.

The exception is for degrees which require a minimum Advanced Mathematics composite result of 65%. In these cases, students will need to achieve a result of 60% or higher in FSP 118 to progress to FSP218.

Learning resources

Students are required to purchase the following texts for this subject:

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

3 Unit Mathematics - Book 2, by S.B. Jones and K.E. Couchman. ISBN: 0-582-81054-X

Some lessons will be supplemented by handouts from the class teacher. Students will require a folder to store and organise these so that useful handouts and worksheets are available for revision purposes.

In addition to the texts listed above, students may refer to the following books for topics not covered in the required texts (these are highlighted in bold in the weekly outline):

New Senior Mathematics: 2 unit course for Years 11 & 12, by J.B. Fitzpatrick.
ISBN: 0 85859 352 1

New Senior Mathematics: 3 unit course for Years 11 & 12, by J.B. Fitzpatrick.
ISBN: 0 85859 353 X.

New Senior Mathematics: 4 unit course for Year 12, by J.B. Fitzpatrick.
ISBN: 0 85859 569 9.

Mathematical Methods for Engineers and Scientists, 3rd Ed, by G.F. Fitz-Gerald & I.A. Peckham. ISBN: 1 74009 733 5.

Calculators

Students will be required to bring a scientific calculator to all classes.

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 Advanced Mathematics 2 will enable students to:

- ▶ Determine the limits of various functions and demonstrate an understanding of the role of limits in differential calculus
- ▶ Find the derivative of various functions, including polynomial, exponential, logarithmic, trigonometric and inverse trigonometric functions.
- ▶ Apply the product, quotient and function of function rules for differentiation.
- ▶ Use differentiation in geometrical applications, such as sketching simple curves, finding the equations of tangents and normals to curves.
- ▶ Determine definite and indefinite integrals and apply integration to finding area and volume.
- ▶ Apply calculus to the solution of problems in the physical world.
- ▶ Demonstrate a working knowledge of polynomials.
- ▶ Be proficient in integration methods of substitution, partial fractions and parts.

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

Limits	11.9 – 11.10, Fitz2: 14(a)
Differentiation:	
-By first principles	11.1 – 11.2

Week 2

Differentiation (cont'd):	
-By rules of differentiation	11.3 – 11.4
-Of products and quotients	12.1 – 12.2
-Using chain rule (function of a function)	12.3 – 12.6
Tangents and Normals	11.5

Week 3

Stationary points	11.6,
Curve sketching using calculus	11.7, 16.1 – 16.5
Applications of differentiation	11.8, 16.6

Week 4

The primitive function	16.7, 16.8
Indefinite integrals of polynomial functions	18.2 – 18.4

Week 5

Integration (Cont'd)	
-Definite integrals	18.5
-Applications of integration	18.6 – 18.8, 18.11

Week 6

Exponential and logarithmic functions and their calculus	19.1 – 19.9, 19.11 Q.1 - 4, 19.13
Revision for mid-session test	

Week 7

Mid-session test	Topics from Weeks 1 - 6
Trigonometric limits	Fitz3: 24(d)
Differentiation of trig functions	20.8
Integration of trig functions	20.9 – 20.10, 24.2 Q.8 - 12

Week 8

Graphs of inverse trig. functions	27.1 – 27.3
Derivatives of inverse trig functions	27.5
Integration involving inverse trig functions	27.6

Week 9

Applications of calculus to the physical world:	
-linear motion	22.1 – 22.3
-exponential growth & decay	22.6 – 22.8

Week 10

Polynomials	
-Graphs of polynomials	28.1 – 28.2
-Division of polynomials	28.3
-Remainder and factor theorems	28.4 – 28.5
-Roots & coefficients of polynomials	28.6
-Numerical estimation of roots	28.7 – 28.8

Week 11

Advanced methods of integration:	
-Using substitution	25.4 – 25.5
-Using partial fractions	Fitz4: 33(d) – 33(e), 36(d)

Week 12

Review of integration	25.1 – 25.3
Revision for final exam	

Weeks 13 & 14 Final examination Period

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

Reference legend:

Fitz2: 'New Senior Mathematics: 2 unit course for Years 11 & 12', Fitzpatrick
Fitz3: 'New Senior Mathematics: 3 unit course for Years 11 & 12', Fitzpatrick
Fitz4: 'New Senior Mathematics: 4 unit course for Year 12', Fitzpatrick
Fitz-Gerald: 'Mathematical Methods for Engineers and Scientists' 3rd Ed, G.F. Fitz-Gerald & I.A. Peckham. ISBN: 1 74009 733 5.

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 2, 4, 9 and 12	15%	20-40 minutes
Mid-Session test	Week 7	30%	1 hour 30 minutes
Final examination	Week 13/14	50%	3 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%**

Four quizzes will be held during weeks 2, 4, 9 and 12 of session. These quizzes will be informal assessment tasks of approximately 20-40 minutes' duration, and will usually cover only one or two topics. Students will be given at least one week's notice of each quiz.

Mid-Session Test **30%**

The mid-session test will be held in week 7 and will examine topics covered during weeks 1 to 6. The test will be of approximately 1 hour and 30 minutes duration.

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

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