MATHEMATICAL FOUNDATIONS

course code: math1050

Lecturer: Dr Jan Chabrowski

Course Code: math1050
Course Title: Mathematical Foundations
Semester 2 2005

Brief description of course content (e.g. handbook description)
This course aims to consolidate students’ knowledge and skills in calculus and linear algebra, and to extend this knowledge to provide a firm basis for further study in mathematics. It covers matrices, vectors, sequences, complex numbers and calculus. It is designed for students with secondary school Maths B (or MATH1040) and covers the core content of the secondary school Maths C course.

Lecturer: Dr Jan Chabrowski
Office: 67-347 (Priestley Building)
Phone: 33653259
Email: jhc@maths.uq.edu.au

Consultation hours: Wednesday 10am – 12am

Web page: The course profile can be found on the web at the following address: http://www.maths.uq.edu.au/~jhc/MATH1050. This also contains up-to-date news about the course material and announcements for students. Please check this regularly during the semester.
Lecture notes, tutorial problems and assignments can be found on the web at the following address: www.maths.uq.edu.au/~bmm/MATH1050

MID SEMESTER EXAMINATIONS WILL BE HELD ON 9TH SEPTEMBER AT 9am IN ROOM 50 N201

Change of rooms for tutorials:

T1 moved to 1 - E219
T2 moved to 83 - S301
T3 moved to 68 - 320

Tutorial groups:
T1  surnames A - G
T2  surnames H - O
T3  surnames P -
Class contact hours: This course is worth 2 units. The contact hours are 3 lectures, 1 tutorial and 1 practice class (3L, 1T, 1C)

Assumed background:
This course assumes that you have a good understanding of the course material in either secondary school Maths B or MATH1040. It is a student’s responsibility to fill in any gaps in the assumed knowledge,

Course goals/rationale:

On completing this course students will:
- Be able to perform basic operations with vectors and matrices;
- Be able to model physical situations using vectors;
- Be familiar with arithmetic and geometric sequences and some of their applications;
- Be familiar with the representations of complex numbers and the fundamental theorem of algebra;
- Be able to calculate the derivative of many functions, and be familiar with applications of the derivative;
- Be able to use a variety of techniques of integration.

Graduate Attributes

The following graduate attributes will be developed in the course:

In-Depth Knowledge of the Field of Study
- A comprehensive and well-founded knowledge of the field of study.
- An understanding of how other disciplines relate to the field of study.
- An international perspective on the field of study.

Effective Communication
- The ability to collect, analyse, and organise information and ideas, and to convey those ideas clearly and fluently, in both written and spoken forms.
- The ability to interact effectively with others in order to work towards a common outcome.
- The ability to select and use the appropriate level, style and means of communication.
- The ability to engage effectively and appropriately with information and communication technologies.
Independence and Creativity

- The ability to work and learn independently.
- The ability to generate ideas and adapt innovatively to changing environments.
- The ability to identify problems, create solutions, innovate and improve current practices.

Critical Judgement

- The ability to define and analyse problems
- The ability to apply critical reasoning to issues through independent thought and informed judgement
- The ability to evaluate opinions, make decisions and to reflect critically on the justifications for decisions.

Ethical And Social Understanding

- An understanding of social and civic responsibility
- An appreciation of the philosophical and social contexts of a discipline
- A knowledge and respect of ethics and ethical standards in relation to a major area of study
- A knowledge of other cultures and times and an appreciation of cultural diversity.

For more information on the University policy on development of graduate attributes in courses, refer to the web

Teaching and Learning Methods:

Each week students should attend three hours of lectures, one hour of practice class. Please see SI-net for the times and locations of these classes.

- Lecture start in week 1. Tutorials and practice classes start in week
- The purpose of the various forms of class contact are as follows.
- Lectures define the course material. They set out the basic theory and demonstrate techniques for problem solving. They cover all the core material required for the course. Students are expected to bring their course notes to each lecture. During the lectures, students are expected to annotate their course notes as the lecturer works through notes, complete the examples in the course notes, and answer or ask questions when opportunities arise. They are also used to provide administrative information for the course.
- Tutorials provide students with an opportunity for individual assistance. Students will be given a set of problems to complete during each tutorial, giving them opportunity to practice mathematical techniques with assistance available from a tutor and/ or from their peers.
- The practice class provide an opportunity for students to work through examples as a group at a slower pace than in lectures, with the opportunity to ask more questions.
- All classes start on the hour and conclude at 50 minutes past the hour.
ASSESSMENT

Required assessment tasks

The assessment for this course will be based on four assignments, a mid semester exam and an end of semester examination. The mid semester exam is worth of 20 marks, the final exam 60 marks and each assignment is worth 5 marks. The mid semester exam will be held in week 7 during lecture time. The actual date will be announced on the web and in lectures as soon as possible.

Due dates for assignments:
1 assignment --- 19 August
2 assignment --- 9 September
3 assignment --- 7 October
4 assignment --- 28 October

Copies of assignment will be handed out at lectures.

The mid semester exam will be based on the material covered in the first 6 weeks.

The final two hours examination will cover the material from the entire semester.

Any pocket calculators are permitted but contents of memory must be erased.

Grades will be awarded according to the following scale:

1 - 24 marks grade 1
25 - 44 marks grade 2
45 - 49 marks grade 3
50 - 64 marks grade 4
65 - 74 marks grade 5
75 - 85 marks grade 6
86 - 100 marks grade 7

Assessment criteria

Solutions will be marked for accuracy, appropriateness of mathematical techniques and clarity of presentation, as demonstrated by examples presented in lectures

Criteria for the award of grades

Your grade for this course will be determined by which of the following levels of achievement that you consistently display in the items of summative assessment.

Grade of 7: (86% - 100%) the student demonstrates an excellent understanding of the theory of the topics listed in the course outline and is highly proficient in applying the techniques to solve both theoretical and practical problems.
Grade of 6: (75% - 85%) the student demonstrates a comprehensive understanding of the theory of the topics listed in the course outline and is proficient in applying the techniques to solve both theoretical and practical problems.

Grade of 5: (65% - 74%) the student demonstrates a good understanding of the theory of the topics listed in the course outline and can apply the techniques to solve problems.

Grade of 4: (50 – 64%) the student demonstrates an understanding of the theory of the topics listed in the course outline and demonstrates a knowledge of the techniques used to solve problems.

Grade of 3: (45% - 49%) the student demonstrates some understanding of the theory of the topics listed in the course outline and demonstrates a knowledge of the techniques used to solve problems.

Grade of 2: (25 – 44%) the student demonstrates limited understanding of the theory of the topics listed in the course outline and demonstrates limited knowledge of the techniques used to solve problems. This includes attempts at expressing their deductions and explanations and attempts to answer a few questions accurately.

Grade of 1: (1 – 24%) the student demonstrates very limited understanding of the theory of the topics listed in the course outline and of the basic concepts in the course material. This includes attempts at answering some questions but demonstrating very limited understanding of the key concepts.

Assessment policy

Students should be familiar with the rules which relate to assessment in their degrees as well as general university policy such as found in the General Award Rules. These are all set out on the myAdvisor page on the UQ website


Plagiarism

The University has adopted the following definition of plagiarism:

“Plagiarism is the action or practice of taking and using as one’s own the thoughts or writings of another, without acknowledgment. The following practices constitute acts of plagiarism and are major infringements of the University’s academic values:

- Where paragraphs, sentences, a single sentence or significant parts of a sentence are copied directly, and are not enclosed in quotation marks and appropriately footnoted;

- Where direct quotations are not used, but are paraphrased or summarised, and the source of the material is not acknowledged either by footnoting or other simple reference within the text of the paper;
• Where an idea which appears elsewhere in printed, electronic or audio-visual material is used or developed without reference being made to the author or the source of that material.”

When a student knowingly plagiarises someone’s work, there is intent to gain an advantage and this may constitute misconduct.

Students are encouraged to study together and to discuss ideas, but this should not result in students handing in the same or similar assessment work. Do not allow another student to copy your work. While students may discuss approaches to tackling a tutorial problem, care must be taken to submit individual and different answers to the problem. Submitting the same or largely similar answers to an assignment or tutorial problem may constitute misconduct, an may result in both students being granted a mark zero for that assignment.

For more information on the University policy on plagiarism, please refer to http://www.uq.edu.au/hupp/index.html?page=25128&pid=25075

**Supplementary examinations**

A supplementary examination may be awarded in one course to students who obtain a grade of 2 or 3 in the final semester of their program and require this course to finish their degree. You should check the rules for your degree program for information on the possible award of supplementary examinations. Applications for supplementary examinations must be made to the Director of Studies in the Faculty.

EPSA Faculty policy on the award of supplementary exams may be found via the Faculty Guidelines on Examinations from the EPSA student page http://www.epsa.uq.edu.au/index.html?page=7640&pid=7563

**Special examinations**

If a student is unable to sit a scheduled examination for medical or other adverse reasons, she/he can and should apply for a special examination. Applications made on medical grounds should be accompanied by a medical certificate; those on other grounds must be supported by a personal declaration stating the facts on which the application relies.

Applications for special examinations for central and end-of-semester exams must be made through the Student Centre. Applications for special examinations in school exams are made to the course coordinator.

More information on the University’s assessment policy may be found http://www.uq.edu.au/hupp/index.html?page=25113&pid=25075

EPSA Faculty policy on the award of special exams may be found via the Faculty Guidelines on Examinations from the EPSA student page http://www.epsa.uq.edu.au/index.html?page=7640&pid=7563
Feedback on assessment

You may request feedback on assessment in this course progressively throughout the semester from the course coordinator. Feedback on assessment may include discussion, written comments on work, model answers, lists of common mistakes and the like.

Students may peruse examinations scripts and obtain feedback on performance in a final examination provided that the request is made within six months of the release of final course results. After a period of six months following the release of results, examination scripts may be destroyed.

Information on the University’s policy on access to feedback on assessment may be found at http://www.uq.edu.au/hupp/index.html?page=25114&pid=25075

EPSA Faculty policy on assessment feedback and re-marking may be found at http://www.epsa.uq.edu.au/index.html?pe=7674&pid=7564

Resources

Course notes
Your course notes are your own personal copy of the slides used in lecture, with space to fill in the examples we will work through. It is vital you obtain a copy of the notes. You can buy them at uni copy shop (or print from the course web page)

Textbook and references

There is no compulsory textbook for this course, the following books are recommended: Calculus 4th or 5th ed., 1999 or 2003, by Stewart, Brooks/Cole publishing (Physical Sciences & Engineering library QA303.S8825 2003)


These textbooks are also currently the textbooks for MATH1051 and MATH1052 so you may wish to buy them if you intend further study.

Copies of course material such as tutorial questions, solutions to tutorial questions, and solutions to assignments will be handed out in lectures. They can also be downloaded as pdf files from the course web page.

Other Assistance

First learning centre
There is a learning centre for all first year mathematic courses, located in room 67—443 (level four of the Priestley building). The times at which tutors will be available in the learning centre will be advertised in lectures.
Library contact

The liaison librarian for the physical sciences disciplines is located in the Physical Sciences and Engineering Library in the Hawken Building and may be consulted for assistance in the course:

Leith Woodall
Email: l.woodall@library.uq.edu.au
Extension: 52367

Students with disabilities

Any student with a disability who may require alternative academic arrangements in the course is encouraged to seek advice at the commencement of the semester from a Disability Adviser at Student Support Services.

Assistance for Students

Students with English language difficulties should contact the course coordinator or tutors for the course.

Students with English language difficulties who require development of their English skills should contact the Institute for Continuing and TESOL Education on extension 56565.

The Learning Assistance Unit located in the Relaxation Block in Student Support Services. You may consult learning advisers in the unit to provide assistance with study skills, writing assignments and the like. Individual sessions are available. Student Support Services also offers workshops to assist students. For more information, phone 51704 or on the web http://www.sss.uq.edu.au/index.html.

Student Liaison Officer

The School of Physical Sciences has a Student Liaison Officer as an independent source of advice to assist students with resolving academic difficulties.

The Student Liaison officer during 2005 will be Dr Peter Adams, Room 547 Priestley building, (email pa@maths.uq.edu.au)

Program of work for the semester

The following list of topics for MATH1050 is intended as a rough guide.

- Matrices; addition and scalar multiplication, transpose, inverse, determinants, solving simultaneous equations;
- Vectors: representations of vectors, addition and scalar multiplication, scalar product, vector product, applications of vectors;
- Sequences and series: arithmetic and geometric progression, applications to compound interest and population growth, proof by mathematical induction;
- Complex numbers: representations, Argand diagram, de Moivres’s theorem, Euler’s identity, roots of polynomials;
- Functions: review of functions, inverse functions, composition of functions, logarithmic and exponential functions;
• Differentiation: limits, derivative from first principles, derivative rules, applications of the derivative to curve sketching and rate of change problems;
• Integration: indefinite and definite integrals, the fundamental theorem of calculus, integration by substitution.