



The University of Southern Queensland

## Course specification

The current and official versions of the course specifications are available on the web at <http://www.usq.edu.au/coursespecification/current>.  
Please consult the web for updates that may occur during the year.

### Description: Engineering Mathematics 1

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
MAT	1500	87442	1, 2009	ONC	1.00	Toowoomba

<b>Academic group:</b>	FOSCI
<b>Academic org:</b>	FOS003
<b>Student contribution band:</b>	6
<b>ASCED code:</b>	010101

### STAFFING

Examiner: Dmitry Strunin

### OTHER REQUISITES

Current skills at the level of Queensland Senior Secondary School Studies Mathematics B

### RATIONALE

Students entering tertiary studies in engineering and surveying require mathematical skills in a wide range of areas, and experience in applying these skills to problem solving in engineering contexts. Assuming that students have basic competencies, this course further explores and develops skills understanding of a range of mathematical concepts that are needed in tertiary programs in engineering and surveying. To establish strong foundations for engineering theory, computation and modeling, applications are explored within engineering contexts.

### SYNOPSIS

Assuming current skills at the level of Queensland Senior Secondary School Studies Mathematics B, this course strengthens and further develops algebra, function, trigonometric, exponential, logarithm and graphing competencies, and introduces matrices, vectors and calculus. Emphasis is placed on developing strong foundation skills in these areas for use in Engineering studies, and on exploring and applying these skills to a range of engineering and surveying contexts.

### OBJECTIVES

On successful completion of this course the student will be able to:

1. demonstrate a sound understanding of mathematical concepts that are essential for tertiary studies in engineering and surveying (Assignments, Exam);
2. demonstrate proficiency in the mathematical skills and competencies covered in this course (Assignments, Exam);
3. interpret and solve a range of authentic problems involving mathematical concepts relevant to this course (Assignments, Exam);

- effectively communicate the mathematical concepts, reasoning and technical skills contained in this course (Assignments, Exam).

## TOPICS

	Description	Weighting (%)
1.	Mathematical writing, communication and study.	10.00
2.	Number calculation, scientific notation and rounding. Basic geometry. Algebra, including factorizing, solving equations and inequalities. Function concepts, linear, quadratic, polynomial and rational functions, exponential and logarithmic functions and their graphs. Inverses, compositions and asymptotes, and applications to engineering contexts.	30.00
3.	Trigonometric functions and identities, inverse trigonometric functions, and their applications to engineering contexts;	20.00
4.	Vectors, scalars and scalar product, basic concepts and applications	10.00
5.	Matrices, matrix multiplication, the inverse and determinant of a 2x2 matrix, and applications.	10.00
6.	Calculus: the concept of gradient and differentiation, differentiation of simple functions, optimization; and applications to engineering and science.	20.00

## TEXT and MATERIALS required to be PURCHASED or ACCESSED

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at <http://bookshop.usq.edu.au> click 'Semester', then enter your 'Course Code' (no spaces).

2009, *Study Book 2009, Course MAT1500 Engineering Mathematics 1*, USQ Distance Education Centre, Toowoomba.

Scientific calculator

## REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.

Texts that are titled College Algebra, Pre-Calculus and Calculus will be helpful.

James, Glyn 2007, *Modern engineering mathematics*, 4th edn, Prentice Hall, Harlow.

## STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessments	30.00
Lectures	26.00
Private Study	80.00
Tutorials	26.00

## ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
ASSIGNMENT 1	20.00	5.00	16 Mar 2009
ASSIGNMENT 2	100.00	15.00	20 Apr 2009
ASSIGNMENT 3	100.00	15.00	01 Jun 2009
CMA's	100.00	0.00	12 Jun 2009
2HR OPEN EXAMINATION	100.00	65.00	END S1 (see note 1)

### NOTES

1. Examination dates will be available during the Semester. Please refer to Examination timetable when published.

## IMPORTANT ASSESSMENT INFORMATION

- 1 Attendance requirements:  
It is the students' responsibility to attend and participate appropriately in all activities (such as lectures, tutorials, workshops, laboratories and practical work) scheduled for them, and to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration.
- 2 Requirements for students to complete each assessment item satisfactorily:  
To complete each of the assignments satisfactorily, students must obtain at least 50% of the marks available for the assignment. To complete the examination satisfactorily, students must obtain at least 50% of the marks available for the examination.
- 3 Penalties for late submission of required work:  
If students submit assignments after the due date without (prior) approval of the examiner then a penalty of 5% of the total marks gained by the student for the assignment may apply for each working day late up to ten working days at which time a mark of zero may be recorded. No assignments will be accepted after model answers have been posted.
- 4 Requirements for student to be awarded a passing grade in the course:  
To be assured of receiving a passing grade a student must achieve at least 50% of the total weighted marks available for the course
- 5 Method used to combine assessment results to attain final grade:  
The final grades for students will be assigned on the basis of the aggregate of the weighted marks obtained for each of the summative assessment items in the course.

- 6 Examination information:  
An open examination is one in which candidates may have access to any printed or written material and a calculator during the examination.
- 7 Examination period when Deferred/Supplementary examinations will be held:  
Any Deferred or Supplementary examinations for this course will be held during the next examination period.
- 8 University Regulations:  
Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10 Academic Misconduct for further information and to avoid actions which might contravene University Regulations. These regulations can be found at the URL <http://www.usq.edu.au/corporateservices/calendar/part5.htm> or in the current USQ Handbook.

## **ASSESSMENT NOTES**

- 9 Students will require access to e-mail and web access to USQConnect for this course.
- 10 The due date for an assignment is the date by which a student must despatch the assignment to the USQ. The onus is on the student to provide proof of the despatch date, if requested by the Examiner. Students must retain a copy of each item submitted for assessment. This must be produced within 24 hours if required by the Examiner. The Examiner may grant an extension of the due date of an assignment in extenuating circumstances.
- 11 The Faculty will normally only accept assessments that have been written, typed or printed on paper-based media. The Faculty will NOT accept submission of assignments by facsimile.