



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 3

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
MAT	2500	91472	2, 2009	ONC	1.00	Toowoomba

Academic group:	FOSCI
Academic org:	FOS003
Student contribution band:	6
ASCED code:	010101

STAFFING

Examiner: Dmitry Strunin
Moderator: John Leis

REQUISITES

Pre-requisite: MAT1102 or MAT1502 or Students must be enrolled in one of the following Programs: MSBI or GCEN or GDET or METC

RATIONALE

This course follows MAT1502 Engineering Mathematics 2 in developing the theory and competencies needed for a wide range of engineering applications. In particular, the concepts and techniques of differential equations, multivariable calculus and linear algebra are furthered, and some of their engineering applications are explored.

SYNOPSIS

This course covers multivariable calculus including representation of functions of several variables, surfaces and curves in space, partial differentiation, optimisation, directional derivatives, gradient, divergence and curl, line integrals, iterated integrals, Green's theorem. Students are introduced to differential equations including direction fields, Euler's method, first order separable, first order linear and second order linear with constant coefficients. Linear algebra concepts are extended to systems of linear equations, projections, transformations, eigenvalues and eigenvectors, diagonalisation, and applications are explored.

OBJECTIVES

On completion of this course students will be able to:

1. demonstrate advances in understanding of mathematical concepts that are essential for tertiary studies in engineering and surveying (Assignments, Homework and Exam);
2. demonstrate proficiency in the skills and competencies covered in this course (Assignments, Homework and Exam);

3. interpret and solve a range of authentic problems involving mathematical concepts relevant to this course and to engineering (Assignments, Homework and Exam);
4. effectively communicate the mathematical concepts, reasoning and technical skills contained in this course (Assignments, Homework and Exam).

TOPICS

	Description	Weighting (%)
1.	Differential Equations and Series: direction fields - first order linear DEs - Taylor series - Fourier series - Euler's method - second order linear DEs with constant coefficients - engineering applications	35.00
2.	Multivariable Calculus: curves in space - surfaces in space - functions of several variables - partial differentiation - geometric interpretation of partial derivatives - maxima/minima problems - directional derivatives - vector fields - curl and divergence - line and work integrals - independence of path - engineering applications	30.00
3.	Linear Algebra: linearly independent vectors - systems of linear algebraic equations - eigenvalues and eigenvectors - symmetric matrices - engineering applications	35.00

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).

Desirable: Scientific calculator, Matlab

James, G 2007, *Modern Engineering Mathematics*, 4th edn, Prentice Hall, Harlow.

USQ Study Book 2009, *Course MAT2500 Engineering Mathematics 3*, USQ Distance Education Centre, Toowoomba.

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.

James, G 2008, *Student's Solutions Manual for James, Modern Engineering Mathematics*, 4th edn, Pearson (Prentice Hall), Harlow.

Kreysig, E 2006, *Advanced engineering mathematics*, 9th edn, Wiley, Hoboken, NJ.

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessments	16.00
Examinations	2.00
Lectures	56.00
Private Study	72.00
Tutorials	28.00

ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
ASSIGNMENT 1	50.00	14.00	01 Sep 2009 (see note 1)
WEEKLY HOMEWORK	50.00	14.00	01 Oct 2009 (see note 2)
ASSIGNMENT 2	50.00	14.00	01 Oct 2009 (see note 3)
2 HR OPEN EXAMINATION	50.00	58.00	END S2 (see note 4)

NOTES

1. Exact dates will be specified in the course Introductory Book.
2. Exact dates will be specified in the course Introductory Book.
3. Exact dates will be specified in the course Introductory Book.
4. 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, 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 the assignments satisfactorily, students must obtain at least a total of 50% of the marks available for the assignments. 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 an 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

- 1 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.
- 2 Students must retain a copy of each item submitted for assessment. If requested, students will be required to provide a copy of assignments submitted for assessment purposes. Such copies should be despatched to USQ within 24 hours of receipt of a request being made.
- 3 The examiner may grant an extension of the due date of an assignment in extenuating circumstances.
- 4 The Faculty will normally only accept assessments that have been written, typed or printed on paper-based media.
- 5 The Faculty will NOT accept submission of assignments by facsimile.
- 6 Students who do not have regular access to postal services or who are otherwise disadvantaged by these regulations may be given special consideration. They should contact the examiner of the course to negotiate such special arrangements.
- 7 In the event that a due date for an assignment falls on a local public holiday in their area, such as a Show holiday, the due date for the assignment will be the next day. Students are to note on the assignment cover the date of the public holiday for the Examiner's convenience.
- 8 Students who have undertaken all of the required assessments in a course but who have failed to meet some of the specified objectives of a course within the normally prescribed time may be awarded the temporary grade: IM (Incomplete - Make up). An IM grade will only be awarded when, in the opinion of the examiner, a student will be able to achieve the remaining objectives of the course after a period of non directed personal study.
- 9 Students who, for medical, family/personal, or employment-related reasons, are unable to complete an assignment or to sit for an examination at the scheduled time may apply to defer an assessment in a course. Such a request must be accompanied by appropriate supporting documentation. One of the following temporary grades may be awarded IDS

(Incomplete - Deferred Examination; IDM (Incomplete Deferred Make-up); IDB
(Incomplete - Both Deferred Examination and Deferred Make-up).