UNSW Course Outline

MATH2018 Engineering Mathematics 2D - 2024

Published on the 29 Aug 2024

General Course Information

Course Code : MATH2018
Year : 2024
Term : Term 3
Teaching Period : T3
Is a multi-term course? : No
Faculty : Faculty of Science
Academic Unit : School of Mathematics & Statistics
Delivery Mode : Multimodal
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Undergraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

This course allows students in Engineering programs to explore a range of concepts at the core of applied mathematics. Through a series of online lectures and problem-solving classes, students are shown various methodologies to solving practical example problems from these

topics in their discipline.
Topics include: partial differentiation and applications, vector algebra, double integrals, ordinary differential equations, introduction to vector field theory, extrema of functions of 2 variables, matrices and their applications, Laplace transforms, Fourier series, partial differential equations and their solution for selected physical problems.
Note: Available only to students for whom it is specifically required as part of their program. MATH2018 is equivalent to MATH2019.

Course Aims

This course is designed to introduce students of Engineering to some mathematical tools and analytical reasoning that may be related to, and useful in, their future professions. The course features the mathematical foundations which some of the world's engineering advancements have rested on, or are related to. The course is not designed to be over-technical in terms of theoretical mathematics, rather it features a range of highly useful concepts that are at the core of applied mathematics.

Relationship to Other Courses

Prerequisite: MATH1231 or MATH1241 or MATH1251 or DPST1014

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Relate concepts and methods from applied mathematics and describe how these may be used in real-world problems drawn from various fields of engineering.
CLO2 : Analyse and categorise problems from applied mathematics and engineering, break them into their constituent steps, and apply appropriate mathematical methods in multivariate calculus; differential equations; matrix theory; Laplace Transforms; and Fourier Series.
CLO3 : Demonstrate mastery of mathematical techniques by constructing logical solutions to problems in engineering that require creative and critical thinking.

Course Learning Outcomes	Assessment Item
CLO1 : Relate concepts and methods from applied mathematics and describe how these may be used in real-world problems drawn from various fields of engineering.	• Mobius online quizzes • Computer Lab Test 1 • Computer Lab Test 2 • Final exam
CLO2 : Analyse and categorise problems from applied mathematics and engineering, break them into their constituent steps, and apply appropriate mathematical methods in multivariate calculus; differential equations; matrix theory; Laplace Transforms; and Fourier Series.	• Mobius online quizzes • Computer Lab Test 1 • Computer Lab Test 2 • Final exam
CLO3 : Demonstrate mastery of mathematical techniques by constructing logical solutions to problems in engineering that require creative and critical thinking.	• Computer Lab Test 1 • Final exam

Learning and Teaching Technologies

Moodle - Learning Management System | Blackboard Collaborate

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Mobius online quizzes Assessment Format: Individual	10%	Due Date: Every fortnight
Computer Lab Test 1 Assessment Format: Individual	15%	Due Date: Computer Lab test in Week 5
Computer Lab Test 2 Assessment Format: Individual	15%	Due Date: Computer Lab Test in Week 9
Final exam Assessment Format: Individual	60%	Due Date: During official examination period

Assessment Details

Mobius online quizzes

Assessment Overview

The online quizzes are released through the Term at the rate of roughly one a week and due within a fortnight. The quizzes enable you to judge your grasp of the material as it is presented and encourage you to keep pace with the material.

The quizzes are computer marked. The result is returned to students immediately.

The quizzes are held Weeks 1-9 (graded) plus 3 revision quizzes weeks 3,6 and 10 (ungraded).

Course Learning Outcomes

- CLO1 : Relate concepts and methods from applied mathematics and describe how these may be used in real-world problems drawn from various fields of engineering.
- CLO2 : Analyse and categorise problems from applied mathematics and engineering, break them into their constituent steps, and apply appropriate mathematical methods in multivariate calculus; differential equations; matrix theory; Laplace Transforms; and Fourier Series.

Assignment submission Turnitin type

Not Applicable

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate

information or answers.

For more information on Generative AI and permitted use please see here.

Computer Lab Test 1

Assessment Overview

The Computer Lab Test will run for 45 minutes, and covers topics 1, 2 and 3.

You will complete the test in the computer lab in Week 5.

Questions will typically be similar in style to the Weekly Online Quiz questions.

You will receive their mark instantly upon completion of the Test, with more feedback available at their next tutorial class.

Course Learning Outcomes

- CLO1 : Relate concepts and methods from applied mathematics and describe how these may be used in real-world problems drawn from various fields of engineering.
- CLO2 : Analyse and categorise problems from applied mathematics and engineering, break them into their constituent steps, and apply appropriate mathematical methods in multivariate calculus; differential equations; matrix theory; Laplace Transforms; and Fourier Series.
- CLO3 : Demonstrate mastery of mathematical techniques by constructing logical solutions to problems in engineering that require creative and critical thinking.

Assessment information

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PRIVACY NOTICE: Screen capture video recording will be used for this assessment task. The recording will be used by the School of Mathematics and Statistics to monitor the assessment task, aid the investigation and resolution of technical issues, improve assessment design and for academic integrity purposes. The recording will be securely stored and will only be accessible by specific staff in the School who require access to administer the assessment task. Recordings will be securely destroyed once they are no longer required. Any personal information collected in the recording is managed in accordance with the University's Privacy Policy and Student Privacy Statement.

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Computer Lab Test 2

Assessment Overview

This computer Lab Test will run for 45 minutes and cover content from topics 4, 5 and 6.
You will complete the test in the computer labs in Week 9.

Questions will typically be similar in style to the Weekly Online Quiz questions.

You will receive their mark instantly upon completion of the Test, with more feedback available at their next tutorial class.

Course Learning Outcomes

- CLO1 : Relate concepts and methods from applied mathematics and describe how these may be used in real-world problems drawn from various fields of engineering.
- CLO2 : Analyse and categorise problems from applied mathematics and engineering, break them into their constituent steps, and apply appropriate mathematical methods in multivariate calculus; differential equations; matrix theory; Laplace Transforms; and Fourier Series.

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Final exam

Assessment Overview

The final exam covers the content of the entire course. It is designed to summarise your learning and problem-solving skills on all topics delivered across the term; including materials from lectures and tutorials. The exam is typically 2 hours.

The examination will occur during the official university examination period.

Feedback is available through inquiry with the course convenor.

Course Learning Outcomes

- CLO1 : Relate concepts and methods from applied mathematics and describe how these may be used in real-world problems drawn from various fields of engineering.
- CLO2 : Analyse and categorise problems from applied mathematics and engineering, break them into their constituent steps, and apply appropriate mathematical methods in multivariate calculus; differential equations; matrix theory; Laplace Transforms; and Fourier Series.
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General Assessment Information

Grading Basis

Standard

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 9 September - 15 September	Lecture	Functions of Several Variables
	Tutorial	Functions of Several Variables
Week 2 : 16 September - 22 September	Lecture	Scalar Fields
	Tutorial	Scalar Fields
Week 3 : 23 September - 29 September	Lecture	Vector Fields
	Tutorial	Vector Fields
Week 4 : 30 September - 6 October	Lecture	Double Integration
	Tutorial	Double Integration
Week 5 : 7 October - 13 October	Lecture	Ordinary Differential Equations
	Tutorial	Ordinary Differential Equations
Week 6 : 14 October - 20 October	Homework	Flexibility week
Week 7 : 21 October - 27 October	Lecture	Matrices
	Tutorial	Matrices
Week 8 : 28 October - 3 November	Lecture	Laplace Transforms
	Tutorial	Laplace Transforms
Week 9 : 4 November - 10 November	Lecture	Fourier Series
	Tutorial	Fourier Series
Week 10 : 11 November - 17 November	Lecture	Partial Differential Equations
	Tutorial	Partial Differential Equations

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

Course Resources

Prescribed Resources

Textbooks

• E. Kreyszig, Advanced Engineering Mathematics (Wiley, 8th or 9th or 10th Ed.)

• S.L. Salas & E. Hille, Calculus: One and Several Variables (Wiley, 7th, 8th, 9th or 10th Ed.)

• Stroud & Booth, Advanced Engineering Mathematics 6e

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Lecturer	Anna Cai		Anita B Lawrence Centre East 4070	9385 7039	Monday to Friday	No	Yes

Other Useful Information

Academic Information

Upon your enrolment at UNSW, you share responsibility with us for maintaining a safe, harmonious and tolerant University environment.

You are required to:

- Comply with the University's conditions of enrolment.
- Act responsibly, ethically, safely and with integrity.
- Observe standards of equity and respect in dealing with every member of the UNSW community.
- Engage in lawful behaviour.
- Use and care for University resources in a responsible and appropriate manner.
- Maintain the University's reputation and good standing.

For more information, visit the UNSW Student Code of Conduct Website.

Academic Honesty and Plagarism

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism.
Further information about referencing styles can be located at https://student.unsw.edu.au/referencing

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect, responsibility and courage. At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.
Further information about academic integrity, plagiarism and the use of AI in assessments can be located at:

- The Current Students site,
- The ELISE training site, and
- The Use of AI for assessments site.

The Student Conduct and Integrity Unit provides further resources to assist you to understand your conduct obligations as a student: https://student.unsw.edu.au/conduct

Submission of Assessment Tasks

Penalty for Late Submissions
UNSW has a standard late submission penalty of:

- 5% per day,
- for all assessments where a penalty applies,
- capped at five days (120 hours) from the assessment deadline, after which a student cannot submit an assessment, and
- no permitted variation.

Any variations to the above will be explicitly stated in the Course Outline for a given course or assessment task.

Students are expected to manage their time to meet deadlines and to request extensions as early as possible before the deadline.

Special Consideration

If circumstances prevent you from attending/completing an assessment task, you must officially apply for special consideration, usually within 3 days of the sitting date/due date. You can apply by logging onto myUNSW and following the link in the My Student Profile Tab. Medical documentation or other documentation explaining your absence must be submitted with your application. Once your application has been assessed, you will be contacted via your student email address to be advised of the official outcome and any actions that need to be taken from there. For more information about special consideration, please visit: https://student.unsw.edu.au/special-consideration

Important note: UNSW has a "fit to sit/submit" rule, which means that if you sit an exam or submit a piece of assessment, you are declaring yourself fit to do so and cannot later apply for Special Consideration. This is to ensure that if you feel unwell or are faced with significant circumstances beyond your control that affect your ability to study, you do not sit an examination or submit an assessment that does not reflect your best performance. Instead, you should apply for Special Consideration as soon as you realise you are not well enough or are otherwise unable to sit or submit an assessment.

Faculty-specific Information

Additional support for students

- The Current Students Gateway
- Student Support
- Academic Skills and Support
- Student Wellbeing, Health and Safety
- Equitable Learning Services
- UNSW IT Service Centre
- Science EDI Student Initiatives, Offerings and Guidelines

School-specific Information

School of Mathematics and Statistics and UNSW Policies

The School of Mathematics and Statistics has adopted a number of policies relating to enrolment, attendance, assessment, plagiarism, cheating, special consideration etc. These are in addition to the Policies of The University of New South Wales. Individual courses may also adopt other policies in addition to or replacing some of the School ones. These will be clearly notified in the Course Initial Handout and on the Course Home Pages on the Maths Stats web site. Students

in courses run by the School of Mathematics and Statistics should be aware of the School and Course policies by reading the appropriate pages on the web site starting at: The School of Mathematics and Statistics assessment policies

The School of Mathematics and Statistics will assume that all its students have read and understood the School policies on the above pages and any individual course policies on the Course Initial Handout and Course Home Page. Lack of knowledge about a policy will not be an excuse for failing to follow the procedure in it.

Special Consideration - Short Extension Policy

The School of Mathematics and Statistics has carefully reviewed its range of assignments and projects to determine their suitability for automatic short extensions as set out by the UNSW Short Extension Policy. Upon comprehensive examination of our course offerings that incorporate these types of assessments, we have concluded that our current deadline structures already accommodate the possibility of unexpected circumstances that may lead students to require additional days for submission. Consequently, the School of Mathematics and Statistics has decided to universally opt out of the Short Extension provision for all its courses, having pre-emptively integrated flexibility into our assessment deadlines. The decision is subject to revision in response to the introduction of new course offerings. Students may still apply for Special Consideration via the usual procedures.

Computing Lab

The main computing laboratory is room G012 of the Anita B.Lawrence Centre (formerly Red Centre). You can get to this lab by entering the building through the main entrance to the School of Mathematics (on the Mezzanine Level) and then going down the stairs to the Ground Level. A second smaller lab is Room M020, located on the mezzanine level through the glass door (and along the corridor) opposite the School's entrance.

For more information, including opening hours, see the computing facilities webpage. Remember that there will always be unscheduled periods when the computers are not working because of equipment problems and that this is not a valid excuse for not completing assessments on time.

School Contact Information

Please visit the School of Mathematics and Statistics website for a range of information.

For information on Courses, please go to “Student life & resources” and either Undergraduate and/or Postgraduate and respective "Undergraduate courses" and "Postgraduate courses" for information on all course offerings.

All school policies, forms and help for students can be located by going to the "Student Services" within “Student life & resources” page. We also post notices in "Student noticeboard" for your information. Please familiarise yourself with the information found in these locations. If you cannot find the answer to your queries on the web you are welcome to contact the Student Services Office directly.

Undergraduate

E: ug.mathsstats@unsw.edu.au

P: 9385 7011 or 9385 7053

Postgraduate

E: pg.mathsstats@unsw.edu.au

P: 9385 7053

Should we need to contact you, we will use your official UNSW email address of in the first instance. **It is your responsibility to regularly check your university email account. Please use your UNSW student email and state your student number in all emails to us.**