Unit study package code: MATH1011
Mode of study: Internal
Tuition pattern summary: Note: For any specific variations to this tuition pattern and for precise information refer to the Learning Activities section.
Lecture: 1 x 2 Hours Weekly
Workshop: 1 x 2 Hours Weekly
This unit does not have a fieldwork component.
Credit Value: 25.0
Pre-requisite units:
10926 (v.0) Mathematics 103 or any previous version
OR
307536 (v.0) Engineering Mathematics 120 or any previous version
OR
307535 (v.0) Engineering Mathematics 110 or any previous version
OR
7062 (v.0) Mathematics 101 or any previous version
OR
MATH1004 (v.0) Mathematics 1 or any previous version
OR
MATH1002 (v.0) Engineering Mathematics 1 or any previous version
OR
MATH1000 (v.0) Engineering Mathematics Specialist 1 or any previous version
OR
MATH1010 (v.0) Advanced Mathematics or any previous version
Co-requisite units: Nil
Anti-requisite units: MATH2003 (v.0) Calculus or any previous version
Result type: Grade/Mark
Approved incidental fees: Information about approved incidental fees can be obtained from our website. Visit fees.curtin.edu.au/incidental_fees.cfm for details.
Unit coordinator:
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Name: Heather Lonsdale
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Location: Building: 314 - Room: 347B
Teaching Staff:

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Administrative contact:

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  - **Phone:** +61 8 9266 9595
  - **Email:** Aimee.Tournay@curtin.edu.au
  - **Location:** Building: 311 - Room: 144

Learning Management System: [Blackboard](lms.curtin.edu.au)
Acknowledgement of Country

We respectfully acknowledge the Indigenous Elders, custodians, their descendants and kin of this land past and present.

Syllabus

This unit builds on students' knowledge of calculus and vectors, further extending to a range of techniques used in solving problems in science, engineering and business-related fields. This unit will cover vectors, lines and planes, and their application to problems in functions of multiple variables. Students will extend their integration skills, covering a variety of different techniques, and learn to solve several types of first and second order differential equations. This unit will also cover several techniques for testing the convergence of a series.

Introduction

Welcome to Mathematics 2. This is a core mathematics unit that will build on prerequisite knowledge to allow students to solve a broad range of mathematical problems. The key focus will be calculus, covering several methods for solving integrals and differential equations. Additionally students will learn a variety of vector techniques, and convergence tests for series.

After completing this unit, students may go on to later mathematics studies such as MATH2009 Advanced Calculus, MATH2010 Linear Algebra, MATH2006 Mathematics and Statistics, or MATH2007 Mathematics and Probability Theory. Students may also use the skills gained in this unit to continue on to other studies in engineering, physics or other fields.

Unit Learning Outcomes

All graduates of Curtin University achieve a set of nine graduate attributes during their course of study. These tell an employer that, through your studies, you have acquired discipline knowledge and a range of other skills and attributes which employers say would be useful in a professional setting. Each unit in your course addresses the graduate attributes through a clearly identified set of learning outcomes. They form a vital part in the process referred to as assurance of learning. The learning outcomes tell you what you are expected to know, understand or be able to do in order to be successful in this unit. Each assessment for this unit is carefully designed to test your achievement of one or more of the unit learning outcomes. On successfully completing all of the assessments you will have achieved all of these learning outcomes.

Your course has been designed so that on graduating we can say you will have achieved all of Curtin’s Graduate Attributes through the assurance of learning process in each unit.

<table>
<thead>
<tr>
<th>On successful completion of this unit students can:</th>
<th>Graduate Attributes addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Apply vector techniques to solve problems on lines and planes</td>
<td>![checkmark]</td>
</tr>
<tr>
<td>2 Analyse multivariable problems using differential and integral calculus</td>
<td>![checkmark]</td>
</tr>
<tr>
<td>3 Demonstrate a variety of techniques for solving differential equations, and for determining convergence of a series</td>
<td>![checkmark]</td>
</tr>
<tr>
<td>4 Justify the appropriate technique or test to apply to solve a range of problems</td>
<td>![checkmark]</td>
</tr>
</tbody>
</table>
Learning Activities

Note that all learning activities in this unit begin in the first week of semester.

Students will have 4 contact hours each week for this unit:

**Lecture (2 hours)**
The lecture will begin to introduce new concepts and techniques to students. The focus of the lecture will be WHAT and HOW:

- what new concepts and techniques will be encountered in the topic
- what applications this topic has to real-world problems
- how to apply various techniques
- how to interpret the result obtained

The format will be a combination of lecturer presentation, group discussion, and working through examples. Partial lecture notes will be posted on Blackboard for students to bring to class, containing an outline of the theory. Spaces are provided to make notes and to complete the exercises as you work through them.

**Workshop (2 hours)**
Workshops will continue to build on the current week's lecture material. The focus of the workshop will be WHY:

- why a given technique is applied, and why it works
- why other techniques do not work or are not as effective
- why we can make certain assumptions or interpretations

The format will be interactive groupwork, with an emphasis on students' oral communication and explanation, to help them consolidate material. The skills in communicating and justifying the choice of various techniques will be built on in the workshops, and assessed through the portfolio.

**At-home study**
In addition to contact hours at university, students are expected to undertake a significant amount of study in their own time: as a general guide, roughly one hour of at-home study for each contact hour. Students are expected to finish any uncompleted portion of the week’s material, and read through the lecture notes - both prior to lectures, to familiarise themselves with the material, and afterwards to consolidate the knowledge. Reference will also be given to relevant sections of the textbook that students may like to refer to.

**Consultation hours / Office hours**
Students are invited to attend consultation hours, with times listed on Blackboard. This is a chance for students to seek individual help from the lecturer on any aspect of the unit, or beyond. It is recommended that students come with specific questions about exercises they have had trouble with, or concepts they do not understand, and bring along any attempted working.
Learning Resources

Recommended texts

You do not have to purchase the following textbooks but you may like to refer to them.

- Stewart, J. (2012) Calculus, 7th Edition, Thomas Brooks/Cole  *(Note that other editions of this text are also fine)*


Other resources

Lecture notes, exercises, and other supporting material will be provided on Blackboard. Workshop questions will be given out in class, with solutions provided after the class.

Calculator and Computer

In this unit you will only be permitted to use a scientific calculator. You may use this for any assessments, provided sufficient working of any intermediate steps is shown.

If you have a graphics calculator, programmable calculator or ClassPad, you are welcome to use these during class or for your own study, but you will not be allowed to use these for assessments.

It is helpful, but not essential, that you have access to a computer with an Internet connection. You can access the computing facilities on campus if you do not have a computer at home.
Assessment

Assessment schedule

<table>
<thead>
<tr>
<th>Task</th>
<th>Value %</th>
<th>Date Due</th>
<th>Unit Learning Outcome(s) Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment</td>
<td>15 percent</td>
<td>Week: 6 (draft), 11 (final) Day: Friday 8 April, Friday 13 May Time: 11:59pm (via Blackboard)</td>
<td>1,2,4</td>
</tr>
<tr>
<td>Test</td>
<td>15 percent</td>
<td>Week: 7 Day: Tuesday 12 April Time: 12pm (during lecture time)</td>
<td>1,2</td>
</tr>
<tr>
<td>Portfolio</td>
<td>20 percent</td>
<td>Week: 4, 10, 13 Day: (during workshop) Time: (during workshop)</td>
<td>23,4</td>
</tr>
<tr>
<td>Examination</td>
<td>50 percent</td>
<td>Week: Exam period Day: TBA Time: TBA</td>
<td>1,2,3</td>
</tr>
</tbody>
</table>

Detailed information on assessment tasks

1. The assignment is a chance for students to apply the knowledge and techniques they have learnt, applying it to a relevant context, and present it for feedback. Assignments should be neatly presented, with full explanations given and all working shown. There will be a chance to submit a draft of the assignment earlier in semester, then to improve and extend on it based on feedback.

2. There will be one mid-semester test, to be held during the lecture timeslot on Tuesday 12 April. Students may use a scientific calculator during the test, provided sufficient working of any intermediate steps is shown, but no graphics or programming calculators or computers.

3. The portfolio will allow students to demonstrate their achievement of the learning outcomes throughout the semester in the three main topics (Integration, Differential Equations, and Series) using oral communication skills. There will also be a reflective component of the portfolio, for students to note their strengths and weaknesses, and monitor their improvement throughout the semester.

4. The final exam will test all topics covered in this unit, in a two hour written exam. Students may use a scientific calculator during the exam, provided sufficient working of any intermediate steps is shown, but no graphics or programming calculators or computers.

Pass requirements

To pass this unit you must:

- Achieve an overall mark greater than or equal to 50, and
- Obtain a minimum of 40% in the final examination

Fair assessment through moderation

Moderation describes a quality assurance process to ensure that assessments are appropriate to the learning outcomes, and that student work is evaluated consistently by assessors. Minimum standards for the moderation of assessment are described in the Assessment and Student Progression Manual, available from...
Late assessment policy
This ensures that the requirements for submission of assignments and other work to be assessed are fair, transparent, equitable, and that penalties are consistently applied.

1. All assessments students are required to submit will have a due date and time specified on this Unit Outline.
2. Students will be penalised by a deduction of ten percent per calendar day for a late assessment submission (eg a mark equivalent to 10% of the total allocated for the assessment will be deducted from the marked value for every day that the assessment is late). This means that an assessment worth 20 marks will have two marks deducted per calendar day late. Hence if it was handed in three calendar days late and given a mark of 16/20, the student would receive 10/20. An assessment more than seven calendar days overdue will not be marked and will receive a mark of 0.

Assessment extension
A student unable to complete an assessment task by/on the original published date/time (eg examinations, tests) or due date/time (eg assignments) must apply for an assessment extension using the Assessment Extension form (available from the Forms page at students.curtin.edu.au/administration/) as prescribed by the Academic Registrar. It is the responsibility of the student to demonstrate and provide evidence for exceptional circumstances beyond the student’s control that prevent them from completing/submitting the assessment task.

The student will be expected to lodge the form and supporting documentation with the unit coordinator before the assessment date/time or due date/time. An application may be accepted up to five working days after the date or due date of the assessment task where the student is able to provide an acceptable explanation as to why he or she was not able to submit the application prior to the assessment date. An application for an assessment extension will not be accepted after the date of the Board of Examiners’ meeting.

Deferred assessments
If your results show that you have been granted a deferred assessment you should immediately check your OASIS email for details.

Deferred examinations/tests will be held from 18/07/2016 to 22/07/2016. Notification to students will be made after the Board of Examiners’ meeting via the Official Communications Channel (OCC) in OASIS.

Supplementary assessments
Supplementary assessments, if granted by the Board of Examiners, will have a due date or be held between 18/07/2016 and 22/07/2016. Notification to students will be made after the Board of Examiners’ meeting via the Official Communications Channel (OCC) in OASIS.

It is the responsibility of students to be available to complete the requirements of a supplementary assessment. If your results show that you have been granted a supplementary assessment you should immediately check your OASIS email for details.

Referencing style
The referencing style for this unit is Chicago.
More information can be found on this style from the Library web site: http://libguides.library.curtin.edu.au/referencing.

Copyright
© Curtin University. The course material for this unit is provided to you for your own research and study only. It is subject to copyright. It is a copyright infringement to make this material available on third party websites.

Academic Integrity (including plagiarism and cheating)
Any conduct by a student that is dishonest or unfair in connection with any academic work is considered to be academic misconduct. Plagiarism and cheating are serious offences that will be investigated and may result in penalties such as reduced or zero grades, annulled units or even termination from the course.

Plagiarism occurs when work or property of another person is presented as one’s own, without appropriate acknowledgement or referencing. Submitting work which has been produced by someone else (e.g. allowing or contracting another person to do the work for which you claim authorship) is also plagiarism. Submitted work is subjected to a plagiarism detection process, which may include the use of text matching systems or interviews with students to determine authorship.

Cheating includes (but is not limited to) asking or paying someone to complete an assessment task for you or any use of unauthorised materials or assistance during an examination or test.

From Semester 1, 2016, all incoming coursework students are required to complete Curtin’s Academic Integrity Program (AIP). If a student does not pass the program by the end of their first study period of enrolment at Curtin, their marks will be withheld until they pass. More information about the AIP can be found at: https://academicintegrity.curtin.edu.au/students/AIP.cfm

Refer to the Academic Integrity tab in Blackboard or academicintegrity.curtin.edu.au for more information, including student guidelines for avoiding plagiarism.

Information and Communications Technology (ICT) Expectations

Curtin students are expected to have reliable internet access in order to connect to OASIS email and learning systems such as Blackboard and Library Services.

You may also require a computer or mobile device for preparing and submitting your work.

For general ICT assistance, in the first instance please contact OASIS Student Support: oasisapps.curtin.edu.au/help/general/support.cfm

For specific assistance with any of the items listed below, please contact The Learning Centre: life.curtin.edu.au/learning-support/learning_centre.htm

- Using Blackboard, the I Drive and Back-Up files
- Introduction to PowerPoint, Word and Excel
Additional information

UniPASS (University Peer Assisted Study Success)

You are lucky enough to have UniPASS support in this unit. Regular attendees at UniPASS can improve their grades by over 10%! That’s a Fail to a Pass, or a Credit to a Distinction, or a Distinction to a High Distinction! No matter where you start, UniPASS will help you ‘level-up’ and maximise your grades.

UniPASS is:

- Weekly structured, informal, study groups
- Led by a successful senior student
- Review unit content and actively embed concepts and ideas
- Improve grades and study skills
- Interactive study session with friends or make new ones – connect to others in your course!
- Free!

UniPASS is NOT:

- A replacement for lectures or tutorials – you should attend/watch the lectures first to get the most benefit!
- A rote learning environment or one-on-one tutoring

Why go to UniPASS?

- **Save time**: 1 hour of UniPASS 3 hours studying by yourself!
- 2015 regular attendees averaged an **12% grade increase**
- Opportunity to **make new friends** – over 2000 students came last year
- Your facilitator has aced this unit, they have **great tips and tricks**!
- Learn **study skills** that will help with ALL your units
- Attend 5 times or more and get invited to a **special revision session** end of semester!
- You’ll regret it if you don’t: 59% of students surveyed who didn’t go, said they wished they had gone regularly!

Where do I sign up?!

- No registration – just turn up!
- Timetables will be posted on Blackboard by the end of week 1, sessions commence in week 2
- Follow the UniPASS link from your Blackboard unit list to find the room number and time
- Choose a session time and come along (bring a friend!) Be early – places are limited

Questions? Contact unipass@curtin.edu.au

Student comments on the positive aspects of UniPASS: (from *UniPASS student survey, 2015 S2*)

“Great relaxed atmosphere and a very worthwhile class to attend”
“...very well structured and provided a different, more interesting and involved way of learning the content”
“It promotes interprofessional practice, builds cultural competency and members learn from their colleagues”
“Encourages discussion so that you are sure you understand the concepts”
“Great way to meet other students and a great forum to ask questions and expand your knowledge”
“Increase grades and gain more holistic knowledge of unit”

Enrolment

It is your responsibility to ensure that your enrolment is correct - you can check your enrolment through the eStudent option on OASIS, where you can also print an Enrolment Advice.
Student Rights and Responsibilities

It is the responsibility of every student to be aware of all relevant legislation, policies and procedures relating to their rights and responsibilities as a student. These include:

- the Student Charter
- the University's Guiding Ethical Principles
- the University's policy and statements on plagiarism and academic integrity
- copyright principles and responsibilities
- the University's policies on appropriate use of software and computer facilities

Information on all these things is available through the University's "Student Rights and Responsibilities" website at: students.curtin.edu.au/rights.

Student Equity

There are a number of factors that might disadvantage some students from participating in their studies or assessments to the best of their ability, under standard conditions. These factors may include a disability or medical condition (e.g. mental illness, chronic illness, physical or sensory disability, learning disability), significant family responsibilities, pregnancy, religious practices, living in a remote location or another reason. If you believe you may be unfairly disadvantaged on these or other grounds please contact Student Equity at eesi@curtin.edu.au or go to http://eesi.curtin.edu.au/student_equity/index.cfm for more information.

You can also contact Counselling and Disability services: http://www.disability.curtin.edu.au or the Multi-faith services: http://life.curtin.edu.au/health-and-wellbeing/about_multifaith_services.htm for further information.

It is important to note that the staff of the university may not be able to meet your needs if they are not informed of your individual circumstances so please get in touch with the appropriate service if you require assistance. For general wellbeing concerns or advice please contact Curtin's Student Wellbeing Advisory Service at: http://life.curtin.edu.au/health-and-wellbeing/student_wellbeing_service.htm

Recent unit changes

Students are encouraged to provide unit feedback through eVALUate, Curtin's online student feedback system. For more information about eVALUate, please refer to evaluate.curtin.edu.au/info/.

To view previous student feedback about this unit, search for the Unit Summary Report at https://evaluate.curtin.edu.au/student/unit_search.cfm. See https://evaluate.curtin.edu.au/info/dates.cfm to find out when you can eVALUate this unit.

Recent changes to this unit include:

- The structure and style of teaching in this unit changed in 2015, shifting to an active learning focus.
- The number of assessment pieces in this unit has decreased from previous years, although there will still be frequent opportunities for students to receive formative feedback on their progress. Additionally, the style of assessment has been changed to allow students a broader range to demonstrate and achieve the learning outcomes.
Program calendar

Note: the following is a guide only, the actual pace may vary. References to relevant chapters in the textbook are given in brackets.

<table>
<thead>
<tr>
<th>Week</th>
<th>Begin Date</th>
<th>Lecture/Workshop</th>
<th>Assessment Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>22 February</td>
<td>Orientation Week</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>29 February</td>
<td>Lines and Planes in space (§12.5)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>7 March</td>
<td>Integration techniques (§7.1, 7.3, 8.2)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>14 March</td>
<td>Integration techniques (§7.4, 7.8, 8.5)</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>21 March</td>
<td>Parametric equations and vector functions (§10.1, 10.2, 13.1-13.4)</td>
<td>Portfolio 1</td>
</tr>
<tr>
<td>5.</td>
<td>28 March</td>
<td>Tuition Free Week</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>4 April</td>
<td>Functions of several variables (§14.1-14.6)</td>
<td>Assignment draft</td>
</tr>
<tr>
<td>7.</td>
<td>11 April</td>
<td>First Order Differential Equations (§9.1-9.3)</td>
<td>Mid-semester test</td>
</tr>
<tr>
<td>8.</td>
<td>18 April</td>
<td>Tuition Free Week</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>25 April</td>
<td>First Order DEs (§9.5, notes)</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>2 May</td>
<td>Second Order DEs (§17.1, 17.2)</td>
<td>Portfolio 2</td>
</tr>
<tr>
<td>11.</td>
<td>9 May</td>
<td>Series (§11.3, 11.4)</td>
<td>Assignment final</td>
</tr>
<tr>
<td>12.</td>
<td>16 May</td>
<td>Series (§11.5-11.8)</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>23 May</td>
<td>Taylor Series (§11.10)</td>
<td>Portfolio final</td>
</tr>
<tr>
<td>14.</td>
<td>30 May</td>
<td>Revision</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>6 June</td>
<td>Study Week</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>13 June</td>
<td>Examinations</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>20 June</td>
<td>Examinations</td>
<td></td>
</tr>
</tbody>
</table>