Unit Outline
MATH1008 Calculus and Linear Algebra
Semester 1, 2016

Unit study package code: MATH1008
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 3 Hours Weekly
Workshop: 1 x 1 Hours Weekly
This unit does not have a fieldwork component.
Credit Value: 25.0
Pre-requisite units: Nil
Co-requisite units: Nil
Anti-requisite units: 10926 (v.0) Mathematics 103 or any previous version
AND 311054 (v.0) Mathematics 146 or any previous version
AND 7062 (v.0) Mathematics 101 or any previous version
AND 7492 (v.0) Mathematics 104 or any previous version
AND MATH1009 (v.0) Calculus and Linear Algebra for Spatial Science or any previous version
AND MATH1010 (v.0) Advanced Mathematics or any previous version
AND MATH1011 (v.0) Mathematics 2 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.
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Acknowledgement of Country

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

Syllabus

Revision of basic differentiation, product, quotient and chain rules, implicit differentiation and related rates, Optimization and differential approximations, curve sketching, calculus with exponential functions and logs, techniques of integration and areas. Volumes of revolution. Vectors: arithmetic, lengths and angles and basic applications. Matrices: elementary matrix algebra, inverse of a 2x2 and solution of a 3x3 system of equations using row reduction. This unit is designed for those student that have passed WACE Mathematics 3A/3B or equivalent. Students who have passed WACE Mathematics 2C/2D should enrol in MATH1007 Pre and Introductory Calculus. Those that have passed WACE Mathematics 3C/3D should enrol in MATH1004 Mathematics 1 and those who have passed WACE Mathematics: Specialist 3C/3D with a mark of >65% should enrol in MATH1010 Advanced Mathematics.

Introduction

On successful completion of this unit, students will have obtained the necessary skills required to undertake advanced calculus courses such as encountered in Engineering or Mathematics majors. They will be able to apply calculus to a wide-ranging variety of real-life problems drawn from business and the life and physical sciences.

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 Utilise skills acquired to undertake advanced calculus courses.</td>
<td></td>
</tr>
<tr>
<td>2 Apply calculus to a wide ranging variety of real life problems drawn from business and the life and physical sciences</td>
<td></td>
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<tr>
<td>3 Use vectors proficiently to solve two and three dimensional problems</td>
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</tr>
<tr>
<td>4 Use matrices to solve systems of equations.</td>
<td></td>
</tr>
</tbody>
</table>

Curtin’s Graduate Attributes

- Apply discipline knowledge
- Thinking skills (use analytical skills to solve problems)
- Information skills (confidence to investigate new ideas)
- Communication skills
- Technology skills
- Learning how to learn (apply principles learnt to new situations)
- (confidence to tackle unfamiliar problems)
- International perspective (value the perspectives of others)
- Cultural understanding (value the perspectives of others)
- Professional Skills (work independently and as a team)
- (plan own work)

Find out more about Curtin’s Graduate attributes at the Office of Teaching & Learning website: ctl.curtin.edu.au
Learning Activities

Lectures. Workshops and Tutorials Online quizzes: Online quizzes. There are at least 1 weekly online quizzes starting in the first week. The first quiz closes in Week 2, and then they regularly close at the same time each week from there. Login to the quizzes to find out when they are due. The purpose of the quizzes is to instil regular work habits. There are hints on how to get the most out of the quizzes in "Online quiz Info" (in Blackboard). Some students have developed a habit of printing out the quiz early in the week, and then enter their solutions just before the quiz closes. Most students who do this end up with scores of 40% or less for each quiz. The problem with this strategy is that if a student has an error or a syntactical issue with the answer to a question, time rapidly diminishes as they, under increasing stress, try to figure out what they have done wrong, and the quiz administrator can’t help, because by the time he answers the query, the quiz will have closed. So, read “Online quiz Info”, and follow its advice. A link to the quizzes is available in Blackboard, but since Blackboard is frequently unavailable, you should take note of the direct address, http://aim02.curtin.edu.au. The online quiz environment is very reliable; if it does happen to be down for a period within 9am-5pm on weekdays, the relevant due date will be extended, but no extension is made if it’s only Blackboard is down. So write down that link! Please email all queries regarding quiz questions to maths-aim@lists.curtin.edu.au and have a subject line of form: M1008 Quiz 4 Question 3. Dr Greg Gamble in Room 314.353, the quiz administrator, will promptly respond to your query. If you use a non-Curtin email address, please also include your Student ID, so that the administrator can look up your quiz. There is no need to send a screen shot of your quiz. Answers to queries will be blogged on the quiz server (so you should back out to the home page of the quizzes, while logged into AiM and check to see if a blogged answer already answers your query). In the past, there was a Discussion Board forum, for AiM queries, for each unit using AiM within Blackboard; this has been discontinued since the disabling of a certain feature now makes such forums impractical. Lastly, note that your AiM password is the one that was emailed to you, before semester started (unless you were a late enrolment); it has 8 lowercase letters; it is not the same as your OASIS/Blackboard password (read Online Quiz Info!).

Learning Resources

Other resources

1 Tables and Formulae - Mathematical Formulae and Statistical Tables for Tertiary Institutions. There are many introductory calculus text books that cover the work for this unit. A text I like: Recommended Texts (not required): Lial, Greenwell & Ritchey, Calculus with Applications Those who wish to go into engineering might like to research what basic text they start with and use that as a reference. Also the library is a great place to find resources.
## 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>
</table>
| Test 1   | 10 percent | Week: Weekly beginning week 1  
Day: as per instruction  
Time: as per instruction | 2,3,4                            |
| Test 2   | 20 percent | Week: Teaching week 5  
Day: Friday the 8th of April  
Time: 2 pm during the lecture | 1,2                              |
| Test 3   | 20 percent | Week: Teaching Week 8  
Day: Friday 6th May  
Time: During Lecture 2 pm | 1,2                              |
| Final Exam | 50 percent | Week: Centrally Scheduled During University Exam Period  
Day: TBA  
Time: TBA | 2,3,4                            |

### Detailed information on assessment tasks

1. Assessment task one begins as we finish the first topic and consists of online quizzes for each topic where student will be awarded a mark out of ten for the semester's work.

2. Assessment task two will test the work covered in topics (teaching weeks from unit calender) 1, 2 and 3. The test will be closed book with students having to supply a scientific calculator. Any notes needed will be supplied by the lecturer. The duration of the test will be at most 50 minutes.

3. Assessment task three will test the work covered in “teaching weeks” 4, 5 and 6 see unit calender. The test will be closed book with students having to supply a scientific calculator. Any notes needed will be supplied by the lecturer. The duration of the test will be at most 50 minutes.

4. Assessment task four will test the work covered in teaching weeks 1 to 12. Students to supply a scientific calculator and an A4 page of notes (double-sided) and the university will supply a tables Book. The duration of the exam will be at most 120 minutes plus 10 minutes reading time.

### Pass requirements

To pass the unit student require 50% overall with a minimum of 40% in the final exam.

### 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 policies.curtin.edu.au/policies/teachingandlearning.cfm
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. Late submission of assessments is not accepted in this unit. Students will receive a zero mark for any assessment item submitted late.

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.

You will need access to an internet connected computer to complete online Quizzes and gain access to unit materials and information posted to BlackBoard

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

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.

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 eesj@curtin.edu.au or go to http://eesj.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:

No recent changes
Program calendar

<table>
<thead>
<tr>
<th>WK</th>
<th>Lecture</th>
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<tbody>
<tr>
<td>1.</td>
<td>Function notation, logarithms and Exponentials</td>
</tr>
<tr>
<td>2.</td>
<td>Limits and intro to differentiation</td>
</tr>
<tr>
<td>3.</td>
<td>Techniques of differentiation</td>
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<tr>
<td>4.</td>
<td>Implicit Differentiation and related rates</td>
</tr>
<tr>
<td>5.</td>
<td>Optimization and curve sketching. (test this week)</td>
</tr>
<tr>
<td>6.</td>
<td>Differential approximation</td>
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<tr>
<td>7.</td>
<td>Basic Integration and Integration by substitution</td>
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<tr>
<td>8.</td>
<td>Area under and between curves volumes of revolution (test this week)</td>
</tr>
<tr>
<td>9.</td>
<td>Introduction to vectors</td>
</tr>
<tr>
<td>10.</td>
<td>More Vectors and Application</td>
</tr>
<tr>
<td>11.</td>
<td>Matrix algebra</td>
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