Unit study package code: MATH1010
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
Tutorial: 1 x 1 Hours Weekly
Workshop: 1 x 2 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
MATH1004 (v.0) Mathematics 1 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:
Title: Dr
Name: Greg Gamble
Phone: +618 9266 3482
Email: G.Gamble@curtin.edu.au
Location: Building: 314 - Room: 353
Consultation times: Tuesday 12:15 - 2:45 with appointment
Teaching Staff:

Administrative contact:
Name: Greg Gamble
Phone: +618 9266 3482
Email: G.Gamble@curtin.edu.au
Location: Building: 314 - Room: 353
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 is designed for those students who have passed WACE Mathematics 3C/3D: Specialist or equivalent with a mark >65%. Students will learn skills, to an advanced level, that are needed to solve such problems that arise in science, engineering and business related fields. To build a solid foundation, we start with logic and through it arrive at mathematical proof, including direct proof; proof by contradiction and induction. We review calculus with rigour, including functions, limits, differentiation, integration. We study linearity in the context of solving systems of linear equations, introductory linear algebra (including eigenvalues and eigenvectors), and linear difference equations and by analogy methods for solving linear differential equations. Finally, we review complex numbers, focussing on geometrical aspects.

Introduction

We cover the following topics:

Some mathematical notation, including notation for sets commonly arising in mathematics, and quantifiers.
Logic and proof: direct proof, proof by contradiction and induction.
Recursively defined sequences.
Review of calculus with rigour: functions, limits, differentiation, integration.
The concept of a linear map.
Solution of systems of linear equations: introduction to linear algebra.
Eigenvalues and eigenvectors with an emphasis on linear techniques.
Linear difference equations and linear differential equations.
Linear transformations in the plane.
Review of complex numbers, focussing on geometrical aspects.

This unit is designed to give a rigorous foundation for MATH1011 Mathematics 2, and subsequent studies in MATH2009 Advanced Calculus and MATH2010 Linear Algebra.

Disclaimer

While this document endeavours to be 100% accurate. Inevitably, there are errors, and problems arise as the semester progresses which need to be dealt with in a manner different to what is stated in this outline, e.g. you will notice some typos. in the syllabus which the lecturer has no control over, and which this introduction tries to correct.
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 Determine an appropriate method of proof (direct, by contradiction or induction) and apply it in proving mathematical statements</td>
<td>🌟🌟🌟</td>
</tr>
<tr>
<td>2 Apply differential and integral calculus with rigour</td>
<td>🌟🌟🌟</td>
</tr>
<tr>
<td>3 Apply linear methods in various settings</td>
<td>🌟🌟🌟</td>
</tr>
<tr>
<td>4 Apply algebraic and geometric methods in complex number problems</td>
<td>🌟🌟🌟</td>
</tr>
<tr>
<td>5 Communicate mathematics with precision</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)
- 🌟 Confident 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
- 🌟 Value the perspectives of others

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

Lectures, some mini i-lectures and tutorials.

Written Assignments

The assignments will be available in the Blackboard site for Advanced Mathematics. As the assignment questions are used for assessment purposes no assistance will be given by the staff. Assistance will be given on any other questions. The assignment must be neatly written in ink, but computer printout will be accepted where this is appropriate. Assignments must have the official cover sheet that can be found as the last page on the assignment questions. Assignments without the completed cover sheet will not be accepted. All pages must be stapled together on the top left hand corner. Assignments should be put in your lecturer/tutor’s assignment box situated opposite the Department of Mathematics Office in Building 314. The solutions to the assignment will be available on Blackboard after the evaluated assignments have been returned.

The due date for each assignment will be stated in Blackboard and on the top of the sheet containing the assignment’s problems.

On-line quizzes

There are weekly online quizzes (worth 10%) starting starting in the first week. The due date for each quiz is given on the quiz itself. You can access these quizzes through the Advanced Mathematics section of Blackboard: click on Online Quizzes. This is a link to the (AiM) web server that hosts the quizzes. Each quiz (except the first quiz) tests any work covered up to its due date. Before you attempt these quizzes, read Online Quiz Info (the link in the Course Menu links to a similar link under Assessments). Alternatively, if Blackboard is down, you may access the online quizzes directly on http://aim03.curtin.edu.au. Queries regarding AiM quiz questions should be directed to the email address: maths-aim@lists.curtin.edu.au. Queries must have subject including the unit, quiz and question number, e.g.: AM Quiz 4 Question 3. The administrator (who is also your lecturer) will endeavour to encapsulate responses to queries in a blog, a link to which is available in the quiz environment. You should visit the blog before posing a query, just in case a response to another student already sufficiently answers the query you were about to pose.

In-class tests

As much as possible the in-class tests will be on one key idea covered in the week’s on-line quiz.

Examination

There is one final examination. This will be held during the examination period at the end of the semester. The final examination will be closed book: notes and books will not be allowed. You will also not be allowed to use a calculator (but the questions will be of a nature that there would be little need for one, anyway).

Learning Resources

Library Reserve

There are resources for this unit in the library Reserve collection. To access these resources, please click on the following link:

http://link.library.curtin.edu.au/primo/course?MATH1010

Recommended texts

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

- Stewart J., Calculus, 7th Edition, Thomson Brooks/Cole. The text is non-essential for this unit, but nevertheless an excellent resource and is the text for the following unit MATH1011 Mathematics 2.

Other resources

Some introductory notes and Quick Notes are available in blackboard.
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 1</td>
<td>10 percent</td>
<td>Week: 1,2,3,4,5,6,7,8,9,10,11,12 Day: TBA Time: As advised at login</td>
<td>1,2,3</td>
</tr>
<tr>
<td>Assignment 2</td>
<td>20 percent</td>
<td>TBA</td>
<td>1,2,5</td>
</tr>
<tr>
<td>In-Class Test</td>
<td>20 percent</td>
<td>TBA</td>
<td>2,3,4</td>
</tr>
<tr>
<td>Final Examination</td>
<td>50 percent</td>
<td>Week: In Exam period Day: TBA Time: TBA</td>
<td>1,3,4</td>
</tr>
</tbody>
</table>

Detailed information on assessment tasks

1. These are the AiM On-line quizzes. See the Learning Activities section for more information. Other details, including closing dates are provided on login to the quizzes.

2. Written assignments (up to 4, but they will be short). A true mathematician must learn to be precise in writing proofs/solutions to problems.

3. Generally, there will be a single question, but sometimes a bonus follow-up question. These will be at regular intervals, either weekly or fortnightly.

4. Either 2 hours or 2 1/2 hours. See further details under Learning Activities.

Pass requirements

To pass this unit you must:

- Achieve a grade/mark greater than or equal to 5/50.
- 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 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. 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.

According to Samuel Johnson (famous writer), “What is written without effort, is often read without pleasure”.

It happens (but hopefully not too often) that the submission of an assignment by a due date, will mean the work is less than complete and not so legible. If by asking for an extension, you can make your work more pleasurable for the lecturer to mark, please do ask!

Generally, the smaller numbers of students engaged in this unit allow for a little more flexibility. It is good discipline for students to try to keep to deadlines, and not procrastinate. However, if an assessment is not completed within 2 weeks of the date assigned, this is a signal that the student has fallen 2 weeks behind. A student who falls 3 weeks behind has negligible chance of passing the unit. So after 2 weeks, sadly the only mark that can be awarded is 0.

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

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 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 unit used to be called Mathematics 101, but is otherwise unchanged in content since 2014. A review of complex numbers was included in 2014, over and above the content of 2013, to ensure coverage of topics was a superset of those of Mathematics 1 (previously known as Mathematics 103).
Program calendar

Note, the schedule below is a guide only. The pace may vary.

<table>
<thead>
<tr>
<th>WK (starting)</th>
<th>Lecture Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>Tuition Free (includes Easter), except catch-up tutorial for Good Friday scheduled on 28 March.</td>
</tr>
<tr>
<td>6. (4 Apr)</td>
<td>Linear difference equations vs linear differential equations. Integration by parts, incl. &quot;tabular method&quot;.</td>
</tr>
<tr>
<td>8.</td>
<td>Tuition Free.</td>
</tr>
<tr>
<td>10. (2 May)</td>
<td>Eigenvalues and eigenvectors. Linear transformations. Applications of the &quot;magic&quot; solution.</td>
</tr>
</tbody>
</table>