Contents

General Information 2
Learning Outcomes 2
General Assessment Information 3
Assessment Tasks 3
Delivery and Resources 4
Unit Schedule 5
Policies and Procedures 6
Graduate Capabilities 7
Compulsory requirements 10
Research and Practice 10

Disclaimer
Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.
General Information

Unit convenor and teaching staff
Unit Convenor
Audrey Markowskei
audrey.markowskei@mq.edu.au
Contact via audrey.markowskei@mq.edu.au
AHH, Level 2
By appointment

Credit points
4

Prerequisites

Corequisites

Co-badged status

Unit description
This unit covers algebra and calculus. The algebra content discusses linearity and applications to geometry. Algebraic techniques involving matrices and determinants are developed and used to study geometrical problems. Linearity is then developed via the notion of vector spaces and used to study systems of linear equations. The notion of a limit is developed and used to study the differential and integral calculus involving functions of one real variable. This is then extended to functions of two real variables. The notion of a limit is enhanced by the study of sequences and series. Numerical techniques for integration are also discussed.

Important Academic Dates
Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes
On successful completion of this unit, you will be able to:

- Development of a range of algebraic skills and proficiency in algebraic techniques applicable to Economics, Finance and Statistics
- Systematic understanding of linear equations and the properties of linear models applicable to Economics, Finance and Statistics
- Apply a wide range of techniques and ideas from differential and integral calculus to the
analyse business, economic and financial data
Investigate a range of optimisation problems using the techniques of calculus
Formulate models of a variety of real world situations using techniques from differential equations.

**General Assessment Information**
No extensions will be granted for any assessment activities. Students who have not submitted a task prior to the deadline for that component will be awarded a mark of 0, except for cases where an application for special consideration is made and approved.

**Assessment Tasks**

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessed Coursework</td>
<td>40%</td>
<td>See iLearn for schedule</td>
</tr>
<tr>
<td>Project</td>
<td>20%</td>
<td>2nd May, 2016 (Monday)</td>
</tr>
<tr>
<td>Final Assessment</td>
<td>40%</td>
<td>15th June, 2016 (Wednesday)</td>
</tr>
</tbody>
</table>

**Assessed Coursework**
Due: See iLearn for schedule
Weighting: 40%

Each major topic has an associated on-line topic quiz containing a number of selected exercises to demonstrate mastery of those techniques and ideas. These are to be completed by the due date specified in iLearn.

On successful completion you will be able to:
- Development of a range of algebraic skills and proficiency in algebraic techniques applicable to Economics, Finance and Statistics
- Systematic understanding of linear equations and the properties of linear models applicable to Economics, Finance and Statistics
- Apply a wide range of techniques and ideas from differential and integral calculus to the analyse business, economic and financial data
- Investigate a range of optimisation problems using the techniques of calculus
- Formulate models of a variety of real world situations using techniques from differential equations.

**Project**
Due: 2nd May, 2016 (Monday)
The project is an extended application where students apply the mathematical skills they have learned to model and solve a number of real world problems.

On successful completion you will be able to:

• Apply a wide range of techniques and ideas from differential and integral calculus to the analyse business, economic and financial data
• Investigate a range of optimisation problems using the techniques of calculus
• Formulate models of a variety of real world situations using techniques from differential equations.

Final Assessment

Due: 15th June, 2016 (Wednesday)

This is a time limited (compulsory) final assessment at the end of the course covering all the topics studied during the semester.

On successful completion you will be able to:

• Development of a range of algebraic skills and proficiency in algebraic techniques applicable to Economics, Finance and Statistics
• Systematic understanding of linear equations and the properties of linear models applicable to Economics, Finance and Statistics
• Apply a wide range of techniques and ideas from differential and integral calculus to the analyse business, economic and financial data
• Investigate a range of optimisation problems using the techniques of calculus

Delivery and Resources

Classes

• This is an online course - there are no classes. The schedule that material is to be completed is available in iLearn.

Required Texts and Materials

There are two textbooks that are required for this course:


Access to MyMathLab and WileyPLUS for the two texts is a compulsory requirement. Students will not be able to complete the required assessment tasks without access. Details of access/textbook options are provided in iLearn.

**Technology requirements**
• Students will require a computer with internet access to enable participation in the course. A calculator with a range of mathematical functions will also be needed.
• Course material and assessments are available on the learning management system (iLearn), WileyPlus and Pearson MyMathLab.

**Unit Schedule**

<table>
<thead>
<tr>
<th>Week</th>
<th>Starting</th>
<th>Task/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29/02/16</td>
<td>Familiarise yourself with the unit materials in iLearn</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Watch the Welcome Video and read the Welcome Booklet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unit 0 - Are you ready?</td>
</tr>
<tr>
<td>2</td>
<td>7/03/16</td>
<td>Unit 1 - The Derivative I</td>
</tr>
<tr>
<td>3</td>
<td>14/03/16</td>
<td>Unit 2 - The Derivative II</td>
</tr>
<tr>
<td>4</td>
<td>21/03/16</td>
<td>Unit 3 - Integration</td>
</tr>
<tr>
<td>5</td>
<td>28/03/16</td>
<td>Unit 4 - Functions of Two Variables</td>
</tr>
<tr>
<td>6</td>
<td>4/04/16</td>
<td>Unit 5 - Differential Equations</td>
</tr>
<tr>
<td>Mid-semester Break</td>
<td>11/04/16</td>
<td>Start working on the project</td>
</tr>
<tr>
<td>7</td>
<td>25/04/16</td>
<td>Complete the project</td>
</tr>
<tr>
<td>8</td>
<td>2/05/16</td>
<td>Unit 6 - Linear Systems and Matrices I</td>
</tr>
<tr>
<td>9</td>
<td>9/05/16</td>
<td>Unit 7 - Matrices II and Applications of Linear Systems</td>
</tr>
<tr>
<td>10</td>
<td>16/05/16</td>
<td>Unit 8 - Determinants and Vectors</td>
</tr>
<tr>
<td>11</td>
<td>23/05/16</td>
<td>Unit 9 - Vector Spaces</td>
</tr>
<tr>
<td>12</td>
<td>30/05/16</td>
<td>Unit 10 - Eigenvalues, Eigenvectors and More Applications</td>
</tr>
</tbody>
</table>

https://unitguides.mq.edu.au/unit_offerings/66582/unit_guide/print
Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:


In addition, a number of other policies can be found in the Learning and Teaching Category of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: [https://students.mq.edu.au/support/student_conduct/](https://students.mq.edu.au/support/student_conduct/)

Results

Results shown in iLearn, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit [ask.mq.edu.au](http://ask.mq.edu.au).

Supplementary Exams

Further information regarding supplementary exams, including dates, is available here [http://www.businessandeconomics.mq.edu.au/current_students/undergraduate/how_do_i/special_consideration](http://www.businessandeconomics.mq.edu.au/current_students/undergraduate/how_do_i/special_consideration)

Student Support

Macquarie University provides a range of support services for students. For details, visit [http://students.mq.edu.au/support/](http://students.mq.edu.au/support/)
Learning Skills
Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support
Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries
For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help
For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University’s IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities
Creative and Innovative
Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Assessment task
- Project

Discipline Specific Knowledge and Skills
Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.
This graduate capability is supported by:

**Learning outcomes**

- Development of a range of algebraic skills and proficiency in algebraic techniques applicable to Economics, Finance and Statistics
- Systematic understanding of linear equations and the properties of linear models applicable to Economics, Finance and Statistics
- Apply a wide range of techniques and ideas from differential and integral calculus to the analyse business, economic and financial data
- Investigate a range of optimisation problems using the techniques of calculus
- Formulate models of a variety of real world situations using techniques from differential equations.

**Assessment tasks**

- Assessed Coursework
- Project
- Final Assessment

**Critical, Analytical and Integrative Thinking**

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

**Learning outcomes**

- Development of a range of algebraic skills and proficiency in algebraic techniques applicable to Economics, Finance and Statistics
- Systematic understanding of linear equations and the properties of linear models applicable to Economics, Finance and Statistics
- Apply a wide range of techniques and ideas from differential and integral calculus to the analyse business, economic and financial data
- Investigate a range of optimisation problems using the techniques of calculus
- Formulate models of a variety of real world situations using techniques from differential equations.

**Assessment tasks**

- Assessed Coursework
Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Development of a range of algebraic skills and proficiency in algebraic techniques applicable to Economics, Finance and Statistics
- Systematic understanding of linear equations and the properties of linear models applicable to Economics, Finance and Statistics
- Apply a wide range of techniques and ideas from differential and integral calculus to the analyse business, economic and financial data
- Investigate a range of optimisation problems using the techniques of calculus
- Formulate models of a variety of real world situations using techniques from differential equations.

Assessment tasks

- Assessed Coursework
- Project
- Final Assessment

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcome

- Formulate models of a variety of real world situations using techniques from differential equations.
Assessment task

• Project

Compulsory requirements

In order to obtain a passing grade in this unit, students must provide a satisfactory demonstration of the attainment of the learning outcomes in the final assessment.

Research and Practice

The development of appropriate mathematical models, and understanding of their properties, together with an appreciation of the underlying assumptions and the impact that any discrepancy between these assumptions and reality may have on the results are key aspects of practice and research in Actuarial science.

This unit focuses on equipping students with these skills and providing opportunities for students to develop and demonstrate these skills through the exploration of a range of techniques applied to case studies. While many of these will be contrived to reduce the complexity to a level that can be analysed with the limited range of tools that can be developed in a one-semester gateway unit, there will be an emphasis on real world problems and the development of good research and professional practice.