

School of Economics and Finance

**QUAN 111**  
**MATHEMATICS FOR ECONOMICS AND FINANCE**

Trimester 2, 2014

**COURSE OUTLINE**

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**Names and Contact Details**

Lecturer/Coordinator: Mohammed Khaled (lecturing weeks 1-3, 10-12)  
Email: [mohammed.khaled@vuw.ac.nz](mailto:mohammed.khaled@vuw.ac.nz)  
Office: RH322  
Phone: 463-5787  
Office hours: Tuesday 10-10.50 in EA116 or by appointment in RH322

Lecturer: Jacek Krawczyk (lecturing weeks 4-9)  
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Office: RH325  
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Course Administrator: Pinky Shah  
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Office: RH319  
Phone: 463-5818

**Trimester Dates**

Teaching Period: Monday 14 July – Friday 17 October

Study Period: Monday 20 October – Thursday 23 October

Examination Period: Friday 24 October – Saturday 15 November (inclusive)

**Withdrawal from Course**

1. Your fees will be refunded if you withdraw from this course on or before Friday 25 July 2014.
2. The standard last date for withdrawal from this course is Friday 26 September. After this date, students forced to withdraw by circumstances beyond their control must apply for permission on an 'Application for Associate Dean's Permission to Withdraw Late' including supporting documentation. The application form is available from either of the Faculty's Student Customer Service Desks.

### **Class Times and Room Numbers**

(CRN 6469)	Tuesday and Thursday	11.00am-11.50am	KKLT303
(CRN 6107)	Tuesday and Friday	3.10pm-4.00pm	HMLT205

Attending lectures is not compulsory, but learning by attending lectures besides reading the textbook is a vital component of the course. To encourage attendance at lectures, and to develop skills in listening and note taking, complete lecture notes are neither uploaded to the course Blackboard site nor supplied to students individually. Please organise a class mate to share notes with in case you have to miss a lecture for any reason.

### **Tutorials**

Besides the lectures, a total of eight 50-minute tutorials will be offered during the trimester according to the scheduled appended on this outline. The available tutorial times and signing in procedure will be notified through our course pages in the VUW website called 'Blackboard': <http://www.blackboard.vuw.ac.nz>. You can sign up for a tutorial at <https://signups.victoria.ac.nz/>.

Attendance at tutorials is not required either. However, attending tutorials is important as model answers to tutorials are not uploaded onto Blackboard nor are they supplied to individual students. The purpose of tutorials is to learn by trying to answer the questions on your own, and then actively participating in discussions about those answers in a small group setting.

### **Course Delivery**

The course is delivered by two weekly lectures and total of eight tutorials during the trimester. Each tutorial is a small-group interactive problem solving session, usually covering the prior lecture material.

### **Course Learning Objectives (CLOs)**

By the end of the course, students should be able to:

1. Carry out mathematical operations on numbers, sets and functions
2. Calculate rates of change using derivatives of functions
3. Find derivatives of functions of a single variable
4. Apply one-variable differentiation (derivatives, product and quotient rules, chain rule, second-order derivatives) to obtain local and global maxima and minima
5. Integrate a rate of change function to recover the function in levels
6. Employ partial differentiation to maximise or minimise functions of two or more variables
7. Represent variables as vectors and assess their linear dependence
8. Implement data operations using matrices
9. Solve linear equation systems using matrices, their determinants and inverses.

### **Prescription**

Mathematical methods appropriate for study of economics and finance: set theory, functions, calculus of functions of one or several variables, financial mathematics, vectors, matrices and systems of linear equations.

### **Group Work**

There is no group work in QUAN 111.

## Expected Workload

You should expect to spend 2 hours in lecture per week, 8 hours in tutorials during the trimester, and about 10 hours per week reading, studying and completing assignments.

## Course Content

A brief outline of the course content, including an indicative schedule for the order of coverage, appears at the end of this course outline.

## Readings

All students should have a copy of the textbook:

Penelope de Boer and Mohammed Khaled, *Mathematics for Business and Economics*, Pearson Prentice Hall, 2007, 2<sup>nd</sup> edition.

This book contains detailed notes on all of the topics covered in the course; no other textbook is necessary. The lecture schedule gives references to the textbook. Here are some optional alternative texts you could consult. The books are ordered in increasing levels of advancement.

Ian Jacques, *Mathematics for Economics and Business*, 5<sup>th</sup> ed., FT-Prentice-Hall, 2006.

Michael Hoy et al., *Mathematics for Economics*, 2<sup>nd</sup> ed., The MIT Press, 2001

Knut Sydsaeter and Peter Hammond, *Essential Mathematics for Economic Analysis*, 2<sup>nd</sup> ed., FT-Prentice-Hall, 2006.

## Materials and Equipment

You must have a calculator that evaluates powers and logs. Calculators will be essential for the test and final exam, however they must be silent in operation and have their own power sources.

## Assessment

From Trimester 1, 2014, a revised Assessment Handbook will apply to all VUW courses: see <http://www.victoria.ac.nz/documents/policy/staff-policy/assessment-handbook.pdf>.

In particular, there will be a new grade scheme, in which the A+ range will be 90-100% and 50-54% will be a C-.

Your performance will be evaluated on the basis of:

Item	Duration	%	Due Date/Test Date	CLOs Covered
Assignment 1	-	-	By 3pm on Monday 4 Aug 2014	-
Test 1	50 minutes	20%	Wednesday 13 Aug 2014	1-3
Assignment 2	-	-	By 3pm on Monday 18 Aug 2014	-
Assignment 3	-	-	By 3pm on Monday 15 Sept 2014	-
Test 2	50 minutes	20%	Wednesday 1 Oct 2014	4-6
Assignment 4	-	-	By 3pm on Monday 6 Oct 2014	-
Exam	2 hours	60%	TBC	1-9

## Tests

Exact times and rooms for the tests are to be announced later on the Blackboard website for the course.

If you are not able to sit the tests for any reason, the weight for the missed items may be added to that for the final exam, if we have a form of documentation of why you cannot make the test. This documentation is to be given to the course administrator as soon as possible. We reserve the right to scale results if necessary to preserve comparability with other years.

### **Assignments**

You should use the assignments as an indicator of your progress and performance. Since aegrotat decisions must be based on internal assessment prior to the final exam, it is important to have this evidence available by completing all assignments and the tests as best you can, *in case you need to apply for an aegrotat pass*.

Assignments should be placed in the appropriate box (by tutor's name), located on Level 2 of Murphy Building. Do not give them to lecturers or tutors. Assignments will be graded either 0, 1 or 2. A zero grade is given for unsatisfactory work, a one is given for satisfactory work and a two is given for exceptional work. It is expected that most students will score a 1 for each assignment. Since the marks are indicative rather than quantitative, there is no need for a provision for remarking. Marks will be displayed weekly on Blackboard.

### **Penalties**

Late assignments will not be marked.

### **Examinations**

Students who enrol in courses with examinations are obliged to attend an examination at the University at any time during the formal examination period. The final examination for this course will be scheduled at some time during the following period:

Friday 24 October – Saturday 15 November (inclusive)

### **Mandatory Course Requirements**

In addition to obtaining an overall course mark of 50 or better, students must sit both tests.

If you cannot sit a test or examination, in the first instance, contact the Course Administrator to discuss the options. In the case that you wish to consider applying for an aegrotat, refer to [www.victoria.ac.nz/home/study/exams-and-assessments/aegrotat](http://www.victoria.ac.nz/home/study/exams-and-assessments/aegrotat)

### **Class Representative**

A class representative will be elected in the first class, and that person's name and contact details made available to VUWSA, the course coordinator and the class. The class representative provides a communication channel to liaise with the course coordinator on behalf of students.

### **Communication of Additional Information**

Additional information concerning this course will be provided in lectures and posted on Blackboard: <http://blackboard.vuw.ac.nz>. Urgent notices will be circulated by email.

### **Student feedback**

Student feedback on University courses may be found at [www.cad.vuw.ac.nz/feedback/feedback\\_display.php](http://www.cad.vuw.ac.nz/feedback/feedback_display.php)

**Link to general information**

For general information about course-related matters, go to

<http://www.victoria.ac.nz/vbs/studenthelp/general-course-information>

**Note to Students**

Your assessed work may also be used for quality assurance purposes, such as to assess the level of achievement of learning objectives as required for accreditation and academic audit. The findings may be used to inform changes aimed at improving the quality of VBS programmes. All material used for such processes will be treated as confidential, and the outcome will not affect your grade for the course.

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## LECTURE SCHEDULE

(Page numbers refer to the text, “Mathematics for Business and Economics” 2<sup>nd</sup> edn.)

	<b>Pages</b>
<b>Week 1 – Enrol in a Tutorial by 8pm on Thursday 17 July 2014</b>	
L.1 Numbers, Number Operations, Simplifying Expressions	1-16
L.2 Inequalities, Absolute Values, Powers	16-22
<b>Week 2 – Tutorial 1</b>	
L.3 Solving Equalities and Inequalities, Simultaneous Equations	22-30
L.4 Sum and Product notations, Set Theory	31-48, 49-55, 58-62
<b>Week 3 – Tutorial 2</b>	
L.5 Functions, Graphing Functions, Inverse Functions	63-66, 69-81
L.6 Logarithmic and Exponential Functions, Composite Functions	81-100
<b>Week 4 – Tutorial 3 – Assignment 1 due</b>	
L.7 Derivatives. Differentiation using Rules	101-107
L.8 Further Differentiation Methods	108-111
<b>Week 5 – TEST 1 (13 August, covers weeks 1-4 topics, rooms to be announced)</b>	
L.9 Application of derivatives: Elasticities. Higher Derivatives	111-115
L.10 Concave functions, Graphs using derivatives, Maxima and Minima	117, 120-126
<b>Week 6 – Tutorial 4 – Assignment 2 due</b>	
L.11 More on Maxima and Minima, Applications	128-129
L.12 Integration	130-135, 138-164
<b>Week 7 – (no tutorial this week)</b>	
L.13 Partial Differentiation	165-170
L.14 Total Derivatives	170-174
<b>Week 8 – Tutorial 5 – Assignment 3 due</b>	
L.15 Optimizing Functions of Two Variables	176-181
L.16 Constrained Optimisation	181-195
<b>Week 9 – Tutorial 6</b>	
L.17 Geometric Progressions, Compound Interest	196-203
L.18 Discounting, Present Values	203-206, 209-215, 223-230
<b>Week 10 – TEST 2 (1 October, covers weeks 5-8 topics, rooms to be announced)</b>	
L.19 Vectors. Inner Products	235-238
L.20 Orthogonal Vectors. Linear Dependence	238-257
<b>Week 11 – Tutorial 7 – Assignment 4 due</b>	
L.21 Matrices	244-250
L.22 Determinants	250-257
<b>Week 12 – Tutorial 8</b>	
L.23 Inverting Matrices	257-259
L.24 Solving Linear Equation Systems	261-267, 275-288