

School of Economics and Finance

**QUAN111**  
**MATHEMATICS FOR ECONOMICS AND FINANCE**

Trimester Two 2006

**COURSE OUTLINE**

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**Contact Details**

Penelope de Boer	EA128/RH319	463-7449/5818	course coordinator
Jaromír Kovářik	RH312	463-6944	
Mohammed Khaled	RH322	463-5787	

**Class Times and Room Numbers**

L1 (CRN 6107)	Tue, Wed, Thu	3:10pm – 4.00pm	MCLT103
L2 (CRN 6469)	Tue, Wed, Thu	5:10pm – 6:00pm	MCLT103

The final examination will be in the period 19 October – 11 November 2006

**Course Objectives**

Students are expected to master differentiation of functions of one and two variables and to apply related techniques to a variety of situations in economics and finance; to become familiar with some mathematical options in *EXCEL*; to understand basic concepts of financial mathematics and use them to calculate interest payments and evaluate investment projects; to recognise linear dependence between vectors, be able to find determinants and inverses of square matrices (up to  $4 \times 4$ ), to solve linear equations and to model input-output relations in terms of linear systems.

## Course Content

### SCHEDULE (References to the text, “Mathematics for Business and Economics”)

#### Week 1 - Enrol in a Tutorial on July 6

Mon	L.1	Real Numbers, Operations and Inequalities.	(pp8-16)
Wed	L.2	Absolute Values. Powers.	(pp16-22)
Thu	L.3	Solving Equations and Inequalities.	(pp22-30)

#### Week 2 - Tutorial 1

Mon	L.4	Set Theory: Basic Ideas, Operations, Venn Diagrams.	(pp47-55)
Wed	L.5	Functions and Relations	(pp61-64)
Thu	L.6	Graphing Functions	(pp66-72)

#### Week 3 - Tutorial 2

Mon	L.7	Inverse Functions. Linear Interpolation.	<b>Ass. 1 due</b> (pp72-76)
Wed	L.8	Logarithmic and Exponential Functions.	(pp76-80)
Thu	L.9	Revision of Chapters 1 to 4.	

#### Week 4 - Tutorial 3

Mon	L.10	Derivatives.	<b>Ass. 2 due</b> (pp96-99)
Wed	L.11	Differentiation Rules.	(pp100-104)
Thu	L.12	Further Differentiation Methods. Elasticities.	(pp104-107)

#### Week 5 - Tutorial 4

Mon	L.13	Higher Derivatives. Maxima and Minima.	<b>Ass. 3 due</b> (pp107-116)
Wed	L.14	Global Maxima and Minima. Graphing Functions Again.	(pp116-118)
Thu	L.15	Newton’s Method. Maxima and Minima Applications.	(pp118-121)

#### Week 6 - Tutorial 5

Mon	L.16	Revision of Calculus of One Variable.	<b>Ass. 4 due</b> (chapter 5)
Wed	L.17	Integration.	(pp121-127)
Thu	L.18	Partial Differentiation.	(pp153-157)

### MID-TRIMESTER TEST THURSDAY 18 AUGUST week 6

6.30 pm – 7.20pm

Covers the course materials for the first sixteen lectures

#### Week 7 - Tutorial 6

Mon	L.19	Total Derivatives.	<b>Ass. 5 due</b> (pp157-161)
Wed	L.20	Optimizing Functions of Two Variables.	(pp161-165)
Thu	L.21	Constrained Optimisation and Revision of Calculus of Two Variables.	(pp165-168)

#### Week 8 - Tutorial 7

Mon	L.22	Geometric Progressions. Interest.	<b>Ass. 6 due</b> (pp178-182)
Wed	L.23	Non-Annual Compounding. Discounting.	(pp182-185)
Thu	L.24	Investment Appraisal.	(pp186-190)

### **Week 9 - Tutorial 8**

Mon	L.25	Annuities.	<b>Ass. 7 due</b> (pp190-195)
Wed	L.26	Variations.	(pp195-198)
Thu	L.27	Revision of Financial Mathematics	(Chapter 7)

### **Week 10 - Tutorial 9**

Mon	L.28	Vectors. Inner Products.	<b>Ass. 8 due</b> (pp210-213)
Wed	L.29	Geometric Interpretation of Vectors.	(pp213-215)
Thu	L.30	Linear Dependence.	(pp215-219)

### **Week 11 - Tutorial 10**

Mon	L.31	Matrices.	<b>Ass. 9 due</b> (pp219-222)
Wed	L.32	Matrice Multiplication and Determinants.	(pp222-227)
Thu	L.33	More on Determinants.	(pp228-231)

### **Week 12 - Tutorial 11**

			<b>Ass 10 due</b>
Mon	L.34	Inverting Matrices.	(pp231-235)
Wed	L.35	Solving Linear Equation Systems.	(pp235-242)
Thu	L.36	Input-Output Models and Revision of Linear Algebra.	(pp242-244)

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### **Expected Workload**

You should expect to spend 4 hours in class per week (3 lectures and 1 tutorial) and to spend 10 – 11 hours per week reading, studying and completing assignments.

### **Readings**

All students should purchase

Mohammed Khaled and Penelope Proffitt, *Mathematics for Business and Economics*, Prentice Hall, 2003

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 that you could consult:

Mik Wisniewski, *Introductory Mathematical Methods in Economics*, 2nd ed. McGraw-Hill, 1996 (HB135 W815 I)

Frank S. Budnick, *Applied Mathematics for Business, Economics and the Social Sciences*, 4th ed. McGraw-Hill, 1993 (QA 37.2 B 927 A)

D. Leonard, *Mathematical Methods in Accountancy, Economics and Finance*, Prentice-Hall of Australia, 1980 (QA 36 L581 M)

K. Holden and A.W. Pearson, *Introductory Mathematics for Economists* Macmillan Press, 1983 (London: 2nd ed) (HB 135 H726 I)

D. Zill, E. Beckenbach, I. Drooyan and W. Wooton, *College Mathematics for Students of Business and the Social Sciences*, Wadsworth, 1977 (QA 37.2 C697)

E.T. Dowling, *Mathematics for Economists*, Schaum/McGraw-Hill, 1980,  
(HB 135 D747 S) has a good selection of worked problems.

If you need to revise basic algebra and calculus, then you could consult the following books, available in the library on Closed Reserve and for purchase through Victoria Book Centre:

Penelope Proffitt, *Maths Made Easy*, Prentice Hall, 2002.

Pat Belgrave and Colin Jeffcoat, *You Can Do Maths*, Dunmore Press, 1995.

Finally, a book which shows in a simple and entertaining way how mathematics can be applied to economic thinking is:

G. Kennedy, *Mathematics for Innumerate Economists*, Holmes & Meier, 1982 (HB 135 K35 M).

### **Materials and Equipment**

Non-programmable calculators are allowed. Graphics calculators are allowed but not recommended.

### **Assessment Requirements**

Your performance will be evaluated on the basis of:

- 30% or 0% - Test, Thursday 18 August 6.30 pm (multichoice)
- 70% or 100% - Final Exam, tba

Your final mark will be calculated as EITHER a weighted average of the marks obtained in the test and the final examination (the weights being 30% and 70% respectively) OR the marks obtained for the final examination, whichever is the higher. To pass the course your final mark must be at least 50%. If you are not able to sit the test, the final examination will be weighted 100% towards your final mark. We reserve the right to scale results if necessary to preserve comparability with other years.

There are also weekly assignments (due 3pm on a Tuesday) – these count towards terms (see below) but do not contribute to your final grade. You should use them as an indicator of your progress and performance.

Assignments should be placed in the appropriate box (by tutor's name), located on Level 2 of Murphy. 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 one for each assignment. Since the marks do not count towards your final grade, there is no need for a provision for remarking. Marks will be displayed weekly on Blackboard.

## **Penalties**

Since assignments do not contribute towards your final mark, there are no penalties nor extensions.

## **Mandatory Course Requirements**

To meet the mandatory course requirements you must

1. complete the two computer exercises (material on Blackboard, #1 due 18 August, #2 due 6 October), **and**
2. submit **on time sufficient assignments to score** at least 5 from the 10 assignments. (Missed assignments will still be marked 0). Note that the marks do not contribute to your final grade.

## **Communication of Additional Information**

Additional information will be conveyed to students via Blackboard. Sometimes you will also be sent emails. These will be sent to the address that you supplied with your enrolment unless you advise otherwise.

## **Faculty of Commerce and Administration Offices**

### Railway West Wing (RWW) - FCA Student and Academic Services Office

The Faculty's Student and Academic Services Office is located on the ground and first floors of the Railway West Wing. The ground floor counter is the first point of contact for general enquiries and FCA forms. Student Administration Advisers are available to discuss course status and give further advice about FCA qualifications. To check for opening hours call the Student and Academic Services Office on (04) 463 5376.

### Easterfield (EA) - FCA/Education/Law Kelburn Office

The Kelburn Campus Office for the Faculties of Commerce and Administration, Education and Law is situated in the Easterfield Building - it includes the ground floor reception desk (EA005) and offices 125a to 131 (Level 1). The office is available for the following:

- Duty tutors for student contact and advice.
- Information concerning administrative and academic matters.
- Forms for FCA Student and Academic Services (e.g. application for academic transcripts, requests for degree audit, COP requests).
- Examinations-related information during the examination period.

To check for opening hours call the Student and Academic Services Office on (04) 463 5376.

## **General University Policies and Statutes**

Students should familiarise themselves with the University's policies and statutes, particularly the Assessment Statute, the Personal Courses of Study Statute, the Statute on Student Conduct and any statutes relating to the particular qualifications being studied; see the Victoria University Calendar available in hard copy or under 'About Victoria' on the VUW home page at [www.vuw.ac.nz](http://www.vuw.ac.nz).

## **Student and Staff Conduct**

The Statute on Student Conduct together with the Policy on Staff Conduct ensure that members of the University community are able to work, learn, study and participate in the academic and social aspects of the University's life in an atmosphere of safety and respect. The Statute on Student Conduct contains information on what conduct is prohibited and what steps are to be taken if there is a complaint. For information about complaint procedures under the Statute on Student Conduct, contact the Facilitator and Disputes Advisor or refer to the statute on the VUW policy website at [www.vuw.ac.nz/policy/studentconduct](http://www.vuw.ac.nz/policy/studentconduct). The Policy on Staff Conduct can be found on the VUW website at [www.vuw.ac.nz/policy/staffconduct](http://www.vuw.ac.nz/policy/staffconduct).

## **Academic Grievances**

If you have any academic problems with your course you should talk to the tutor or lecturer concerned; class representatives may be able to help you in this. If you are not satisfied with the result of that meeting, see the Head of School or the relevant Associate Dean; VUWSA Education Coordinators are available to assist in this process. If, after trying the above channels, you are still unsatisfied, formal grievance procedures can be invoked. These are set out in the Academic Grievances Policy which is published on the VUW website at [www.vuw.ac.nz/policy/academicgrievances](http://www.vuw.ac.nz/policy/academicgrievances).

## **Academic Integrity and Plagiarism**

Academic integrity is about honesty – put simply it means **no cheating**. All members of the University community are responsible for upholding academic integrity, which means staff and students are expected to behave honestly, fairly and with respect for others at all times.

Plagiarism is a form of cheating which undermines academic integrity. The University defines plagiarism as follows:

*The presentation of the work of another person or other persons as if it were one's own, whether intended or not. This includes published or unpublished work, material on the Internet and the work of other student or staff.*

It is still plagiarism even if you re-structure the material or present it in your own style or words.

*Note: It is however, perfectly acceptable to include the work of others as long as that is acknowledged by appropriate referencing.*

Plagiarism is prohibited at Victoria and is not worth the risk. Any enrolled student found guilty of plagiarism will be subject to disciplinary procedures under the Statute on Student Conduct and may be penalised severely. Consequences of being found guilty of plagiarism can include:

- an oral or written warning
- cancellation of your mark for an assessment or a fail grade for the course
- suspension from the course or the University.

Find out more about plagiarism, and how to avoid it, on the University's website at [www.vuw.ac.nz/home/studying/plagiarism.html](http://www.vuw.ac.nz/home/studying/plagiarism.html).

### **Students with Impairments**

The University has a policy of reasonable accommodation of the needs of students with disabilities. The policy aims to give students with disabilities the same opportunity as other students to demonstrate their abilities. If you have a disability, impairment or chronic medical condition (temporary, permanent or recurring) that may impact on your ability to participate, learn and/or achieve in lectures and tutorials or in meeting the course requirements, please contact the Course Coordinator as early in the course as possible. Alternatively you may wish to approach a Student Adviser from Disability Support Services (DSS) to discuss your individual needs and the available options and support on a confidential basis. DSS are located on Level 1, Robert Stout Building, telephone (04) 463 6070, email [disability@vuw.ac.nz](mailto:disability@vuw.ac.nz). The name of your School's Disability Liaison Person is in the relevant prospectus or can be obtained from the School Office or DSS.

### **Student Support**

Staff at Victoria want students to have positive learning experiences at the University. Each Faculty has a designated staff member who can either help you directly if your academic progress is causing you concern, or quickly put you in contact with someone who can. Assistance for specific groups is also available from the Kaiwawao Māori, Manaaki Pihipihinga or Victoria International.

In addition, the Student Services Group (email [student-services@vuw.ac.nz](mailto:student-services@vuw.ac.nz)) is available to provide a variety of support and services. Find out more at [www.vuw.ac.nz/st\\_services/](http://www.vuw.ac.nz/st_services/).

VUWSA employs Education Coordinators who deal with academic problems and provide support, advice and advocacy services, as well as organising class representatives and Faculty delegates. The Education Office (tel. (04) 463 6983 or (04) 463 6984, email [education@vuwsa.org.nz](mailto:education@vuwsa.org.nz)) is located on the ground floor, Student Union Building.

### **Manaaki Pihipihinga - Māori and Pacific Mentoring Programme (Faculty of Commerce and Administration)**

This is a mentoring service for Māori and Pacific students studying at all levels. Weekly one hour sessions are held at the Kelburn and Pipitea Campuses in the Mentoring Rooms, 14 Kelburn Parade, and Room 210 and 211, Level 2, Railway West Wing. Sessions cover drafting and discussing assignments, essay writing, and any questions that may arise from tutorials and/or lectures. A computer suite networked to Cyber Commons is available for student use.

To register with Manaaki Pihipihinga, please contact one of the following:

Puawai Wereta  
Room 210, Level 2  
Railway West Wing  
Tel. (04) 463 8997  
Email: [Puawai.Wereta@vuw.ac.nz](mailto:Puawai.Wereta@vuw.ac.nz)

Fa'afai Seiuli  
Room 109 B  
14 Kelburn Parade  
Tel. (04) 463 5842  
Email: [Faafoi.Seiuli@vuw.ac.nz](mailto:Faafoi.Seiuli@vuw.ac.nz)