

School of Economics and Finance

**QUAN 203 Quantitative Methods for Economics and Finance
(Econometric Theory)**

Trimester Two 2011

COURSE OUTLINE

Staff: John Randal, RH331, phone 463-5558 (L1-12, coordinator)
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Jacek Krawczyk, RH325, phone 463-5352 (L13-24, tutor)
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Lecture times: Thursday and Friday, 08:30–09:20

Lecture venue: RH LT2

Teaching period: Monday 11 July – Friday 14 October

Study period: Monday 17 October – Thursday 20 October

Examination period: Friday 21 October – Saturday 12 November (inclusive)

Withdrawal from Course:

Your fees will be refunded if you withdraw from this course on or before 22 July 2011.

The standard last date for withdrawal from this course is Friday 23 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.

Course website

<http://www.blackboard.vuw.ac.nz/> If QUAN203 does not appear in your list of courses, please email John immediately, with your SCS username.

Course content

Below is a tentative schedule for the course. Changes to the schedule will be advised via Blackboard. The main goal of the course is to enable students to be more comfortable with common mathematical and statistical ideas for further study in economics, finance, and econometrics. We intend to achieve this goal by covering the following topics:

Lectures 1-2; 15 & 16 July Course introduction, math review: series, induction, differentiation and integration. Diagnostic multi-choice take home test.

Lectures 3-4; 22 & 23 July Introduction to probability. Definitions and theorems formalising content covered in QUAN102.

Lectures 5-7; 29 & 30 July, 4 August Discrete random variables and expectation. Poisson distribution: probability function, mean, variance, moment generating function, Poisson as limit of a binomial.

Lectures 8-10; 5, 11 & 12 August Introduction to continuous random variables. Exponential random variable: probability density function, cumulative distribution function, moments, moment generating function. Integration by parts.

Lectures 11-12; 19 & 20 August Joint and conditional distributions, the bivariate normal distribution.

Lectures 13-14; 8 & 9 September Transformation of random variables. The normal and chi-square distributions and their relationship.

Lectures 15-16; 15 & 16 September The sampling distribution, t -distribution. Taylor's Series expansion. The central limit theorem.

Lectures 17-18; 22 & 23 September Estimation: method of moments and maximum likelihood.

Lectures 19-24; 29 & 30 September, 6, 7, 13 & 14 October Linear algebra review. Ordinary least squares regression. Estimation of parameters in the case of a single dependent variable. Estimation and properties of parameters using matrix notation. Multiple regression.

Lecture materials will be supported by practice in the tutorials, and through the assignments. Specific tutorial and assignment exercises will be distributed via Blackboard. You should try the problems in advance of attending the tutorial. The assignment will allow further practice of these skills.

Course learning objectives

We aim to develop essential background econometric theory (including mathematics and statistics) for progression into third year econometrics, and honours in econometrics, economics, or finance. Assessment will test students' knowledge and appreciation of these key concepts.

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

- C1 explain and use formal intermediate level probability theory
- C2 comprehend and apply discrete and continuous random variables in analysis
- C3 analyse probability distributions and models using matrix algebra
- C4 comprehend and apply multivariate distributions in analysis
- C5 understand and make use of conditional random variables and expectations
- C6 derive ordinary least squares, method of moments *and generalised method of moments estimators**, and their statistical properties
- C7 *understand the basis of cross-section data and heteroscedasticity, and design statistical models for these situations.**

*unlikely to be covered in 2011.

Course delivery

Two lectures per week (24 in total), and eight tutorials.

Tutorials

To view and sign up to tutorials go to <https://signups.victoria.ac.nz/>. Tutorial sign up closes on Friday 15 July at noon.

Tutorial exercises will be distributed in class, and via Blackboard. It is strongly recommended that you try the exercises before you attend the class.

Assignments

There will be six assignments issued throughout the course, one corresponding to each tutorial. These will not be given a mark, but they will be reviewed and comments may be made. Submission of them is *strongly recommended*. Full solutions will be provided after the submission date.

In each assignment will be one *challenge* question, which will be difficult. If correctly solved, a $\frac{1}{2}\%$ bonus mark will be added to your grade. In addition, each assignment which has been reasonably attempted (as defined on each assignment) will also attract a $\frac{1}{2}\%$ bonus mark. These must be your own work. Any copying detected may lead to *all assignment marks* being deleted.

Expected workload

A 15 point course has an expected total workload of 150 hours. Deducting the 24 lecture hours, and 8 tutorial hours, this leaves 118 hours. From this you might allocate 20 to preparation for the exam, and 10 to preparation for the term test, leaving 88. Spread over 11 weeks (weeks 2 to 12), this leaves 8 hours per week.

A suggested way of allocating this time is to spend two hours on each of the following:

- preparation for each lecture (by reviewing old material and the published lecture notes)
- reviewing each lecture after its delivery (e.g. making sure your notes are free of errors)
- preparing for the next tutorial by attempting the relevant problems
- preparing assignment material for submission.

Group work

There is no group work component for this course.

Readings

Lecture notes will be provided via Blackboard. Reading these in advance of the lecture, and preparing any preliminary material (i.e. previous lectures) is a very good idea. The recommended text book for the course is: Hogg and Tanis, *Probability And Statistical Inference 8/e*, Pearson, and this is available for \$136 from Vic Books. There are also many textbooks on mathematical statistics in the library which do cover relevant material.

The VUW library has a web page that contains detailed information about library resources and has links to other sites. Its URL is <http://www.vuw.ac.nz/library>

Course Materials

A calculator will be required for completion of this course. Any calculator used for the prerequisites of this course will be appropriate.

Assessment requirements

Bonus marks may be obtained by completing the assignments and challenge questions (see above). These are in addition to the following marks for all students:

A ninety minute test covering lectures 1–10 (Thursday 14 July to Friday 12 August inclusive) will be held at 6:30pm on Thursday 18 August, in HMLT206 (note that this is at the Kelburn campus). *This will be worth 40% of your final grade.*

A two hour exam will be in the University exam period (22 October to 13 November inclusive). *This will be worth the remaining 60% of your final grade.* Reduced emphasis will be placed on content in the first half of the course.

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 audit purposes. The findings may be used to inform changes aimed at improving the quality of FCA programmes. All material used for such processes will be treated as confidential, and the outcome will not affect your grade for the course.

Quality Assurance Note

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 audit purposes. The findings may be used to inform changes aimed at improving the quality of FCA programmes. All material used for such processes will be treated as confidential, and the outcome will not affect your grade for the course.

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 period **Friday 21 October – Saturday 12 November 2011 (inclusive)**.

Penalties

Late assignments will not be marked.

Mandatory course requirements

None.

Communication of additional information

Course notices will generally be relayed in class, via email, and put on Blackboard. Any queries should be directed to John.

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 will be conveyed to students via Blackboard and/or email.

Emails may be sent to the address that you supplied with your enrolment; but they may also be sent to your SCS email address, which is your official university email address. You should keep an eye on both email addresses.

For the following important information follow the links provided:

Academic Integrity and Plagiarism

<http://www.victoria.ac.nz/home/study/plagiarism.aspx>

General University Policies and Statutes

Find key dates, explanations of grades and other useful information at
<http://www.victoria.ac.nz/home/study>

Find out about academic progress and restricted enrolment at
<http://www.victoria.ac.nz/home/study/academic-progress>

The University's statutes and policies are available at
<http://www.victoria.ac.nz/home/about/policy>,
except qualification statutes, which are available via the Calendar webpage at
<http://www.victoria.ac.nz/home.study/calendar> (See Section C)

Further information about the University's academic processes can be found on the website
of the Assistance Vice-Chancellor (Academic) at
http://www.victoria.ac.nz/home/about_victoria/avcacademic/default.aspx

**AVC (Academic)Website: information including: Conduct, Academic Grievances, Students
with Impairments, Student Support**

http://www.victoria.ac.nz/home/about_victoria/avcacademic/Publications.aspx

Faculty of Commerce and Administration Offices

<http://www.victoria.ac.nz/fca/studenthelp/>

Te Putahi Atawhai**Maori and Pacific Mentoring Programme**

http://www.victoria.ac.nz/st_services/tpa/index.aspx