

School of Economics and Finance

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

Trimester 2, 2016

COURSE OUTLINE

Prescription

Quantitative methods for advanced study in economics and finance. Topics include calculus of functions of several variables; matrices and quadratic forms; distribution theory; expectations, with applications to problems in economics and finance.

Course learning objectives

We aim to develop essential background econometric theory (including mathematics and statistics) for progression into third year econometrics, economics or finance, or higher study in those subjects (e.g. honours). 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 multivariate calculus, linear algebra, and probability theory
- C2** use linear algebra to analyse selected applications in economics and finance
- C3** derive properties of discrete and continuous random variables
- C4** manipulate conditional and independent random variables and their expectations
- C5** derive method of moments and maximum likelihood estimators for selected random variables

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:

Weeks 1–3 *Discrete random variables and their properties.* Definitions of: probability function, parameters, mean, variance, moment generating function, moments. Proof of linearity of expectation. Properties of: binomial, Poisson, geometric, hypergeometric, and negative binomial random variables.

Weeks 4–6 *Continuous random variables and their properties.* Definitions of: probability density function, cumulative distribution function, moments, moment generating function. Transformation of continuous random variables. Properties of: uniform, exponential, beta, normal, and chi-square random variables.

Weeks 7–8 *Independent and conditional random variables.* Properties of sums of independent random variables. Sampling distribution. CLT. Joint and conditional distributions; the bivariate normal distribution.

Weeks 9–10 *Regression.* Ordinary least squares. Estimation of parameters in the case of a single dependent variable. Estimation and properties of parameters using matrix notation. Multiple regression.

Weeks 11–12 *Method of moments and maximum likelihood.* MM estimators and MLEs for discrete and continuous distributions. Regression estimators as MM estimators or MLEs.

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.

Trimester Dates

Teaching Period: Monday 11th July to Friday 14th October

Study Period: Monday 17th October to Thursday 20th October

Examination Period: Friday 21st October to Saturday 12th November (inclusive)

Withdrawal from Course:

1. Your fees will be refunded if you withdraw from this course on or before Friday 22 July 2016.
2. The standard last date for withdrawal from this course is Friday 23 September 2016. 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 any of the Faculty's Student Customer Service Desks or online at <http://www.victoria.ac.nz/vbs/studenthelp/publications/Application-for-late-withdrawal-2010.doc>

Staff:

- John Randal, RHG21, phone 463-5558 (lecturer, coordinator)
contact by email: john.randal@vuw.ac.nz
- Jacek Krawczyk, RWW215, phone 463-5352 (lecturer, tutor)
contact by email: j.krawczyk@vuw.ac.nz (note non-standard format)
- Alice Fong, RWW120, phone 463-5353 (administrator)
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Lecture times, venue: Monday and Wednesday, 10:30–11:20, GB LT4

Course delivery

Two lectures per week (24 in total), and a weekly tutorial (from week 2).

Tutorials

You need to sign up for a tutorial group online: <https://student-sa.victoria.ac.nz>. Tutorial signup will be available from 9am, 11 July to 3pm, 18 July. Sign up as early as possible to get your first choice of day/time.

You must attend the tutorial group to which you are assigned. If, because of work or timetable clashes, you are no longer able to attend your allocated tutorial, you must notify the course administrator, to assist you to find a suitable tutorial time.

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 9/e*, Pearson, and this is available from Vic Books. There are also many textbooks on mathematical statistics in the library which do cover relevant material, and resources online best found by googling relevant terms.

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.victoria.ac.nz/library>

Mandatory course requirements

Students must submit all four assignments, scoring at least two marks of one or better.

If you believe that exceptional circumstances may prevent you from meeting the mandatory course requirements, contact the Course Coordinator for advice as soon as possible.

If you cannot complete an assignment or sit a test or examination, refer to <http://www.victoria.ac.nz/home/study/exams-and-assessments/aegrotat>

Expected workload

A 15 point course has an expected total workload of 150 hours. Over the duration of the course, this is roughly 10 hours per week.

A suggested way of allocating this time is to focus 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.

Assessment requirements

The Assessment Handbook will apply to all VUW courses: see <http://www.victoria.ac.nz/documents/policy/staff-policy/assessment-handbook.pdf>.

As below, four assignments are *worth 10% of the final grade*.

A ninety minute test covering lectures 1–12 (inclusive) will be held at 6:40pm on Wednesday 7 September, in GBLT2. *This will be worth 35% of your final grade.*

A two-hour final examination *will be worth the remaining 55% of your final grade*. Reduced emphasis will be placed on content in the first half of the course. You are obliged to attend this examination at the University at any time during the formal examination period.

All CLOs will be assessed in the exam and assignments. CLOs C1 and C3 will also be assessed in the test.

If you cannot complete an assignment or sit the test or examination, refer to <http://www.victoria.ac.nz/home/study/exams-and-assessments/aegrotat>. It is also recommended that you contact the course coordinator at your earliest opportunity.

Examinations

Students 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 21st October to Saturday 12th November (inclusive)

Assignments

There will be four assignments, corresponding to the first four major topics listed above. Assignments will be issued on Blackboard, and submission of these is a *mandatory course requirement*. The assignments will be given one of three marks:

- 0, indicating the assignment is of unacceptable quality
- 1, indicating reasonable understanding/accuracy, but some flaws or omissions
- 2, indicating a near-perfect assignment
- 3, all attempted, all correct.

A mark of less than 4/12 would indicate that you may struggle to pass the test and/or final exam. Discussion of assignments with other students is allowed, but submitted work should be your own. *The purpose of these assignments IS FOR YOU TO LEARN, and copying negates this purpose.* Copied work (for all involved parties) is unacceptable and will not only count as having been missed, but may also initiate disciplinary action against the students concerned.

Marked assignments will be returned at the tutorial of the following week. Uncollected assignments will be disposed of at the end of the course. Late assignments will be given a *zero mark*, but will count as submitted.

The assignments are *worth 10% of your final grade, determined as follows:*

Assignment total	0	1	2	3	4	5	6	7	8	9	10	11	12
Grade contribution	0	2	3	4	5	6	7	8	9	9	10	10	10

Penalties

Late assignments will not be marked (discuss an extension in advance of the due date with the course coordinator).

Course Materials

You might occasionally find a calculator useful during this course. Any calculator used for the prerequisites of this course will be appropriate.

Student feedback

The workload is unchanged from 2015, where the students gave a rating of 2.8 out of 5 (about right). The students strongly agreed (1.4 out of 5) that “preparing for the assessments has helped me to learn”.

A course evaluation will be conducted for this course in Week 12.

A summary of Student feedback on this courses may be found at http://www.cad.vuw.ac.nz/feedback/feedback_display.php

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

Blackboard will be the authoritative location of any information about this course.

We may use Blackboard to send email to you. This will go to your official university email address. Should you prefer to receive these to your personal email address, you can set up your VUW account to forward email. Instructions for doing so are available on Blackboard, in Course Resources.

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.