TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

School of Economics and Finance

QUAN 201 INTRODUCTION TO ECONOMETRICS

Trimester One 2011

COURSE OUTLINE

Names and Contact Details

Lecturer/Course Coordinator:	Dr Mohammed Khaled
Office:	RH 322, Phone 463-5787
Office Hours:	Wednesdays 11.30-12.20, Thursdays 10.30-11.20
Email:	Mohammed.Khaled@vuw.ac.nz
Administration:	Alice Fong, RH 318, Phone: 463-5353 Alice.Fong@vuw.ac.nz

Trimester Dates

Teaching Period: Monday 28 February – Friday 3rd June
Study Period: Monday 6 June – Thursday 9 June
Examination Period: Friday 10 June – Saturday 2 July (inclusive)

Withdrawal from Course

1. Your fees will be refunded if you withdraw from this course on or before 11 March 2011.
2. The standard last date for withdrawal from this course is 14 May 2011. 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

Lectures:		
Mondays	9:30-10:20	Government Building Lecture Theatre 3 (GBLT3)
Wednesdays	9:30-10:20	Government Building Lecture Theatre 3 (GBLT3)

Tutorials:

The first of eight one-hour tutorials/computer lab sessions will begin in the *third* week of the trimester. No tutorials are scheduled for the *seventh* and *eighth* weeks, i.e., in the weeks just before and after the mid-trimester break. In the tutorial sessions, held in a computer laboratory (Railway West Wing, RWW202), you will get an opportunity to apply the material taught in lectures of the previous weeks.

You may be allocated to one of these tutorials (Wednesday 10.30-11.20, Thursday 9.30-10.20, 11.30-12.20, 12.40-1.30) on the basis of your preferences asked for during the first lecture session. Depending on the number of registered students, one of these four times may be cancelled. The final tutorial times and allocation will be announced through the Blackboard website in week 2.

Course Content

A brief outline of the course content (topics to be covered), including an indicative schedule for the order of coverage appears at the end of this course outline.

Course Learning Objectives

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

C1 estimate a relation between two variables using Ordinary Least Squares (OLS), explain how OLS estimators behave in terms of their probability distributions, test hypotheses on the relation between variables using *t*-values and *p*-values, and measure goodness of fit in a regression

C2 estimate a relation between three or more variables using the OLS method, and test two or more hypotheses jointly using *F*-tests or *chi-square* tests

C3 use dummy variables to measure categorical explanatory variables, then test for any associated structural change in the relation between variables

C4 explain the effects of non-constant error variance in estimation and hypothesis tests, and how to adjust the tests and/or estimation to account for these problems

C5 use an econometric computer program to implement the methods listed above

Course Delivery

The course is delivered by two 50-minute lectures per week over the twelve lecture weeks, and eight 50-minute tutorials during those weeks.

Each tutorial session will usually include a brief introduction to the tutorial by the tutor. The tutorial exercises accompanied by detailed notes on how to do them will be available on Blackboard, http://www.blackboard.vuw.ac.nz

You will need to have a printed copy of each tutorial assignment (to be available on Blackboard) at the commencement of that tutorial, but preferably before then so you know about the expected work ahead of time. This is very important; a few spare copies will be available from tutors at the first tutorial, but none after that. Opening a window in a part of your screen to display the tutorial questions is not good enough as it takes up too much time to read it that way; tutors may not be able to help you in following the questions this way. *Tutorials begin in the third week of lectures*. The notes are necessary for the tutorials since they contain:

- a description of each tutorial's objectives
- theoretical material relevant for each tutorial
- detailed calculation procedures and descriptions of statistical functions

Access to the computing laboratories is managed by the Information Technology Services (ITS). You will need to enter your ITS *username* and *password* to log on. *Make sure that these are operational before the tutorials begin*. For any help in this matter, go to an ITS helpdesk. Laser printing is possible from all labs; check with an ITS helpdesk for the payment procedure to be followed. You will usually be using your H: drive for your lab work. As a backup, you can also save it on your own USB (or CD or floppy).

Expected Workload

On average, you will need to devote about 10 hours per week to this course over 15 weeks including the mid-trimester break and the study period:

Lectures: 2 hours × 12 weeks =	24	hours
Tutorial/Lab: 1 hour × 8 weeks =	8	hours
Reading/Reviewing: 7.5 hours × 15 weeks =	112	hours
Assignments: 3 hours × 2 assignments =	6	hours

Readings
The textbook that you should have is:
***Introduction to Modern Econometrics with Applications*, by M. Khaled, Pearson/Prentice-Hall, 2008**.
Other useful (but not compulsory) references are:
Introductory Econometrics, 3rd edition, by J. M. Wooldridge, Thomson/South-Western, 2006, *Introductory Econometrics with Applications* by Ramu Ramanathan, Dryden-HBJ, 2002, *Undergraduate Econometrics* by R. C. Hill, W. E. Griffiths and G. G. Judge, Wiley, 1997, and *A Guide to Econometrics* by Peter Kennedy, The MIT Press, Cambridge, Massachussetts, 1998.

For statistical computing, the primary program used will be EVIEWS at a university computer lab. A student version of this program is also available for home use at a small cost, please check their website for ordering details. All the procedures/commands in this program that are necessary for our course will be introduced through the tutorial notes and exercises that you will be able to download from the Blackboard, http://www.blackboard.vuw.ac.nz prior to each tutorial. For more information on EVIEWS methods, you can look up the help menu in the EVIEWS menu bar – e.g. user's guide.

Materials and Equipment
Electronic pocket calculators of all kinds are permitted at tests or examinations.

Assessment Requirements

Homework Assignments (2)	20%	*Assignment due dates are indicated in the detailed course schedule appended to this outline (Objectives c1 to c5).*
Mid-trimester Test (50 mins)	30%	*In lecture week* 8, *May* 2, *Monday*, 5.30-6.20 pm, *room* GBLT1 *(c1 and c5).*
Final Exam (2 hours)	50%	*During the Examination Period (c1 to c5).*

Any illness or adverse personal circumstances must be notified to the course coordinator – in writing, with medical certificate or relevant evidence – before an assessment. If absence from such assessment is approved, marks for any missed assessment items will be allocated to the Final Exam mark (e.g. if one assignment is missed with approval, then the weighting will be assignments 10%, test 30% and exam 60%).

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 from Friday 10 June – Saturday 2 July 2011.

Penalties
Unapproved late submission of assignments will incur a penalty of 10% per day up to two days. Unauthorised submissions beyond that will not be marked. *At the discretion of the course coordinator, assignments that appear to be copied will be allocated either a mark of zero, or the mark due for any one of the assignments involved (original as well as the copies) will be equally divided amongst the group involved.*

Mandatory Course Requirements
There are no mandatory requirements for this course.

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
Announcements, and any changes relating to the course, will be made through the Blackboard website, http://www.blackboard.vuw.ac.nz. Later in the trimester, copies of the test and final examination questions of the years 2008 and 2009 along with answers will be made available on the Blackboard.

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 www.victoria.ac.nz/home/study.
Find out about academic progress and restricted enrolment at www.victoria.ac.nz/home/study/academic-progress.
The University's statutes and policies are available at www.victoria.ac.nz/home/about/policy, except qualification statutes, which are available via the Calendar webpage at 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 Assistant Vice-Chancellor (Academic) at 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/

Manaaki Pihipihinga Programme
http://www.victoria.ac.nz/st_services/mentoring/

***

The following outline gives the topics we expect to cover, some variations are possible.

Lecture Week	Lecture Topics	Tutorial Topics
1	Estimating causal relationships in economics; Some key statistical concepts: random variable, probability density function (pdf), expected values (mean, variance), Normal distribution, function of a random variable. *** Other probability distributions: chi-square, *t* and *F*; Joint probability distributions; Estimation of unknown parameters of probability distributions: mean, variance, covariance; Covariance and causality. (Assigned Reading: Textbook chapter 1)	*Tutorials in a computer lab begin from the third week. Sometime during the first two weeks, try out your computer logon username and password to avoid any logon problems when tutorials begin.*
2	The simple regression model; Interpretation of coefficients; Basic assumptions; Graphical representation of model. *** Estimation by the ordinary least squares (OLS) method: minimizing the sum of squared residuals. (Assigned Reading: chapter 2, up to p.41)	
3	The OLS normal equations; OLS estimator; Example. *** Properties of OLS estimators: linearity, unbiasedness, efficiency, consistency. (Assigned Reading: chapter 2 remainder)	**Tutorial 1** Data handling in EViews; Calculate descriptive statistics; Draw graphs & scatter plots; Find critical values and probability values from probability distributions.
4	Probability distribution of OLS estimators; Estimating error variance; Interval estimation. *** Testing a hypothesis: the interval method, the t-value method, and the p-value method. (Assigned Reading: chapter 3 up to p.66)	**Tutorial 2** Simple regression estimation, interpretation of estimates.
5	Testing hypotheses with a non-zero null and one-sided alternatives; Measuring goodness of fit. *** Alternative functional forms of variables, and interpretation of the slope coefficients; Comparing the fit of models with the dependent variable in different forms. (Assigned Reading: chapter 3, p.66-69, 74-75; chapter 4, p.78-80, 90-96, 97-98)	**Tutorial 3** Test of a hypothesis using a confidence interval or critical region or p-value. **Assignment 1** handed out on Monday this week in class.

6	Forecasting; Forecast intervals; Forecasting with the dependent variable in the log form; *** Effects of changing units of measurement in linear and log-linear functions. (Assigned Reading: chapter 3, p.69-74; chapter 4, p.88-90, 96-97)	**Tutorial 4** Examining regression residuals to check model specification; Constructing models that are non-linear in variables.
7	Multiple regression: assumptions; interpretation of coefficients in multiple regression. *** Estimation by the OLS method, example with two regressors; How other things are held fixed in multiple regression. (Assigned Reading: chapter 5, up to p.106, 108-110, 112-114)	There are no tutorials this week **Assignment 1 due** this week on Wednesday in class.
MID-TRIMESTER BREAK		
8	Measures of goodness of fit in a multiple regression; Properties of OLS estimators; Coefficient variances and covariances. *** Testing hypotheses in multiple regression; Testing a single linear restriction on coefficients. (Assigned Reading: chapter 5, p.114-120, chapter 6, p.141-144)	There are no tutorials this week **Mid-trimester Test** this week on topics covered by the first six weeks of lectures and readings (i.e. prior to multiple regression). 2 May, Monday, 5.30-6.20 pm, room GBLT1.
9	Selecting the variables to include in a multiple regression; OLS estimation with omission of important variables. *** OLS estimation when unnecessary variables are included. (Assigned Reading: chapter 5, p.120-130)	**Tutorial 5** Fit a multiple regression by solving the normal equations, and also by using the relevant EViews command; simulating the assumption of other things remaining the same by multiple regression. **Assignment 2** handed out this week on Monday in class.
10	Multi-collinearity: consequences, indication, dealing with multicollinearity. *** Selecting the regressors by testing a joint hypothesis: separate t-tests? Testing a joint hypothesis - the WALD F-test. (Assigned Reading: chapter 5, p.130-138; chapter 6, p.145-149)	**Tutorial 6** Model selection by using the $\overline{R}^2$ or the $\overline{R}^2$ measure; Specification error analysis.

11	Testing goodness of fit; F-test of a single hypothesis; $\overline{R}^2$ in relation to the t-statistic. *** Dummy variables; interpreting coefficients of dummy variables; modelling and testing for structural change. (Assigned Reading: chapter 6, p.150-153, chapter 7, up to p.173)	**Tutorial 7** Multi-collinearity analysis; Testing joint hypotheses by the Wald-F test. **Assignment 2 due** this week on Wednesday in class.
12	A violation of assumption on errors: cross-section data and heteroscedasticity; Graphical illustration of its consequences; How to detect heteroscedasticity using plots. *** Breusch-Pagan/White test of heteroscedasticity; Log transformation to alleviate heteroscedasticity; Heteroscedasticity-consistent standard errors. (Assigned Reading: chapter 8, up to p.185, p.188-194)	**Tutorial 8** Binary explanatory variables; Interpreting regression coefficients of binary variables; Regressions with heteroscedastic errors.

*****