Subject Code	**AF5908**
Subject Title	**Applied Econometric Methods in Accounting and Finance Research**
Credit Value	3
Level	5
Normal Duration	One Semester
Pre-requisite / Co-requisite/ Exclusion	None (Recommended Background Knowledge: Any university's introductory level of probability, statistics and mathematics.)
Role and Purposes	This subject focuses on the practical use of econometric methods in the area of accounting and finance. With a minimum level of theoretical discussion, it introduces econometric models. It also explains how to use computer software to estimate the models and how to interpret and report the computer results (Programme Outcome 2). Students may bring their own research problems for class discussion.
Subject Learning Outcomes	Upon completion of the subject, students will be able to: a. Understand the basic econometric concepts and methods, b. Understand the empirical research in Accounting and Finance; c. Able to apply the appropriate econometric techniques to an empirical research project; d. Understand data science in general and the link between data science and econometrics.
Subject Synopsis/ Indicative Syllabus	**Review of basic concepts in econometrics** Descriptive statistic, discrete and continuous random variables and their distributions, commonly-used distributions (uniform, Bernoulli, normal, *t*-, χ^2-, and *F*- distributions), joint and conditional distributions, independence, estimator and estimate, unbiasedness, consistencyand efficiency; law of large numbers (LLN) and central limit theorem (CLT), null (alternative) hypothesis, Type I (Type II) error, significancelevel, *t*-statistic, *p*-value, etc., and a general introduction to data science. **The Simple and Multiple Linear Regression Models** Dependent and independent variables, disturbance (error term), intercept and slope parameters, population regression function (PRF), sample regression function (SRF), ordinary least squares (OLS), fitted value, residual, R-squared (coefficient of determination), unbiasedness, heteroskedasticity, standard error of regression, how to use the regression models in data science. Partial effect, multi-collinearity, exogenous and endogenous explanatory variables, mis-specification, omitted variable bias, standard error of the regression (SER), the Gauss-Markov theorem (BLUE), hypothesis testing with the linear regression models.

	Further Topics with Multiple Regression Models Consistency, asymptotic variance, asymptotic t statistics, Largrange multiplier (LM) test, asymptotic efficiency, asymptotic normality, Adjusted R^2, dummy variable, the Chow test, linear probability model, self-selection problem, heteroskedasticity-robust standard error, Breusch-Pagan test White test for heteroskedasticity, weighted least squares estimators, feasible GLS, measurement error, lagged dependent variable, missing data, non-random sample, outlier. **Time Series Models** Stochastic process (time series process), finite distributed lag (FDL) model, lag distribution, long-run propensity (LRP) or long-run multiplier, auto-correlation, time trend, seasonality, spurious regression, detrending, stationary process, non-stationary process, moving average MA(q), autoregressive process AR(p), random walk, unit root process, integrated of order d (I(d)), Dickey-Fuller test, first difference, co-integration, error correction model, stochastic trend, Durbin-Watson (DW) statistic, ARCH model, the applications of these techniques in data science. **Advanced Models and Methodology** **Panel Data Models (Brief):** Difference-in-differences, fixed effects model, random effects model, Hausman test. **Instrumental Variables Estimation and Two Stage Least Squares:** Instrumental variable, identification, over-identification, under-identification, reduced form equation, errors-in-variables problem. **Qualitative and limited dependent variable models:** Logit/probit models, self-selection models, Tobit model, and their applications to data science and machine learning. **Simultaneous Equation Models:** Structural equation, simultaneity bias, rank and order conditions.
Teaching/Learning Methodology	Econometrics concepts and techniques are introduced and discussed through lectures. Students are expected to actively participate in the class discussion, test and practice. They are required to apply the knowledge and skills to solving problems in the form of class participation and homework assignments. Each student should always bring a scientific calculator with him/her to class for practice.

Assessment Methods in Alignment with Intended Learning Outcomes

Assessment components cover (1) class participation and class tests; (2) Mini-project (a small term paper); and (3) Final exam.

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c			
Class Participation and Tests, Homework Assignments	30%	√	√				
Mini-project or mid-term exam	20%	√	√	√			
Final Exam	50%	√	√	√			
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Given many concepts and calculations in econometrics, class participation (including practice) and class tests are used to help and check students' understanding of the terms and calculation procedures. This requires students to review lecture notes and do their homework assignments before coming to class. The assignments are not graded but would be discussed in class.

The mini-project is a small term paper to assess to what extent a student can apply the econometrics concepts and techniques to a research project properly.

Final examination – three hour examination is designed with two parts covering basic concepts/understanding in Part I and problem-solving questions in Part II. This is one of the most important assessments for a student's performance in this course.

Note: The specific requirements on individual assessment components discussed above could be adjusted based on thepedagogical needs of subject lecturers.

Student Study Effort Expected	Class contact:	
	▪ Lectures / Seminars	39 Hrs.
	Other student study effort:	
	▪ Depends on their backgrounds, on average students are expect to spend 2 more hours for each contact hour for reading subject materials/textbook, and working on homework assignments.	78 Hrs.
	▪ Depending on how easily students can find data, 30 hours are expected for the Mini-project.	30 Hrs.
	Total student study effort	147 Hrs.
Reading List and References	Ai, C. and Norton, E. C., 2003, Interaction terms in logit and probit models, *Economics Letters* 80, 2003, 123–129 Bushee, B.J., 1998, The influence of institutional investors on myopic R&D investment behavior, *Accounting Review* 73, 305-333 Li, D., Nguyen, Q. N., Pham, P. K. and Wei,S. X., Large foreign ownership and firm-level stock return volatility in emerging markets, Forthcoming in *JFQA* Maddala, G.S., 1991, A perspective on the use of limited-dependent and qualitative variables models in accounting research, *Accounting Review* 66, 788-807. Wooldridge, Jeffrey M., *Introductory* Econometrics: A Modern Approach, 4th ed., Thomson Additional readings and references would be distributed in class.	