Subject Description Form

Subject Code	AMA364
Subject Title	Statistical Inference
Credit Value	3
Level	3
Pre-requisite/ Co-requisite/ Exclusion	Pre-requisites: Advanced Mathematical Methods for Economics and Finance (AMA273) or Further Calculus (AMA251) and Probability and Distributions (AMA269 or AMA2691) or Inferential Statistics (AMA237) or Basic Statistics (AMA261) or Statistical Theory (AMA266)
Objectives	This subject is to enable students to understand the theory of statistical inference and apply it to data analysis.
Intended Learning Outcomes	Upon satisfactory completion of the subject, students should be able to: 1. master the fundamental concepts of point estimation and interval estimation; 2. apply methods of estimation, criteria of assessing a good estimator to determine the distribution and statistical properties of an estimator; 3. perform tests of hypotheses relating population parameters and to judge the appropriateness and goodness of tests.
Subject Synopsis/ Indicative Syllabus	*Estimation: (18 hours)* Statistic, unbiased estimator, consistent estimator. Minimum variance unbiased estimator. Efficiency of an unbiased estimator. Sufficiency, Factorisation theorem. Information matrix. Cramér-Rao lower bound. Relative efficiency. Method of moments. Likelihood, maximum likelihood (ML) estimation. Properties of ML estimators. Iterative solutions of ML estimating equation. *Hypothesis testing: (12 hours)* Significance test. Types of error, power of test. Neyman-Pearson theorem. Uniformly most powerful test. Generalised likelihood ratio test. *Bayesian inference: (12 hours)* Bayes' formula, Prior and Posterior distributions. Uniform prior, Conjugate prior. Bayes' solution to decision problem. Loss function, Bayesian estimation. Credible interval. Predictive inference.
Teaching/Learning Methodology	The subject will be delivered mainly through lectures and tutorials. The lectures will be conducted to introduce the statistical inference concepts in the syllabus, which are then reinforced by learning activities involving demonstration, tutorial exercise and assignments/quizzes.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)		
		1	2	3
a. Assignments/Quizzes	40%	✓	✓	
b. Examination	60%	✓	✓	✓
Total	100 %			

Continuous Assessment comprises of assignments and/or quizzes. A written examination is held at the end of the semester.

To pass this subject, students are required to obtain Grade D or above in **both** the Continuous Assessment and the Examination components.

Student Study Effort Required

Class contact:	
▪ Lecture	28 Hrs.
▪ Tutorial	14 Hrs.
Other student study effort:	
▪ Assignment	30 Hrs.
▪ Self-study	36 Hrs.
Total student study effort	108 Hrs.

Reading List and References

Textbook:

Hogg, R.V., McKean, J.W. & Craig, A.T.	Introduction to Mathematical Statistics 7th edition	Prentice Hall 2012

References:

Bain, L.J. & Engelhardt, M.	Introduction to Probability and Mathematical Statistics 2nd edition	Duxbury Press 2000
Casella, G. & Berger, R.L.	Statistical Inference 2nd edition	Duxbury Press 2001
Garthwaite, P., Jolliffe, I. & Byron, J.	Statistical Inference 2nd edition	Oxford Science Publication 2002
Mood, A.M.	Introduction to the Theory of Statistics 3rd edition	McGraw-Hill 1974