

Subject Description Form

Subject Code	AMA614
Subject Title	Mathematical Statistics
Credit Value	3
Level	6
Expected background knowledge	A course in Probability and Statistics and a course in Advanced Calculus
Objectives	To enable students to have an overview and thorough understanding of the modern mathematical statistics theory.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) Use the approach of maximum likelihood to obtain the estimator of parameters of distributions and derive the asymptotic properties of estimators (b) Find the UMVU estimators. (c) Apply the method of pivotal quantity to obtain interval estimates. (d) Use the likelihood ratio principle to construct statistical tests. (e) Find uniformly most powerful tests based on the Neyman-Pearson Lemma.
Subject Synopsis/ Indicative Syllabus	This course is concerned with the fundamental theory of statistical inference. Topics include exponential families of distributions, sufficient statistics, complete statistics, convex loss functions, UMVU estimators, performance of the estimators, maximum likelihood estimation, the information inequality, large-sample comparisons of estimators and asymptotic efficiency.
Teaching/Learning Methodology	The subject will be delivered mainly through lectures and tutorials. The teaching and learning approach is mainly problem-solving oriented. The approach aims at the development of solid mathematical techniques and how the techniques can be applied to solving research and real application problems. Students are encouraged to adopt a deep study approach by employing high level cognitive strategies, such as critical and evaluative thinking, relating, integrating and applying theories to practice.

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)				
			a	b	c	d	e
	1. CA	40	✓	✓	✓	✓	✓
	2. Exam	60	✓	✓	✓	✓	✓
Total	100 %						
<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>The subject focuses on knowledge and understanding of Statistical Theory. The Exam-based assessment is the most appropriate assessment method, including tests and examination. Moreover, assignments are included as a component of continuous assessment so as to keep the students in progress.</p> <p>Continuous Assessment comprises of assignments and a mid-term test. A written examination is held at the end of the semester.</p>							
Student Study Effort Expected	Class contact:						
	▪ Lecture						26Hrs.
	▪ Tutorial						13Hrs.
	Other student study effort:						
	▪ Assignment						30Hrs.
	▪ Self-study						61Hrs.
	Total student study effort						130Hrs.
Reading List and References	J. Shao, Mathematical Statistics. Springer. 2003.						
	G. Casella and R. L. Berger, Statistical Inference. Second edition, Thomson, 2002.						
	E. Lehmann and G. Casella, Theory of Point Estimation. Second Edition, 1998						
	Ferguson, T. S. A Course in Large Sample Theory. 1996						