Subject Description Form

Subject Code	AMA529
Subject Title	Statistical Inference
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	**Pre-requisite:** AMA528 Probability and Stochastic Models
Objectives	To enable students to understand the theory and practice of statistical inference.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) Understand the concepts of random sampling, statistical inference and sampling distribution, and use basic sampling distributions. (b) Utilize the main methods of estimation to obtain estimators for unknown parameters. (c) Construct confidence intervals for unknown parameters. (d) Understand the concepts of test hypotheses and apply them. (e) Employ Bayesian approach to parameter estimation, hypothesis testing, and model selection.
Subject Synopsis/ Indicative Syllabus	Review of probability and distributions. Estimation Theory: Point estimation, method of moments, percentile matching, maximum likelihood, sufficient statistics, exponential family, completeness, bias, variance, mean squared error, minimum variance unbiased estimator, Cramer-Rao lower bound, Fisher's information, Rao-Blackwell theorem, asymptotic distributions, interval estimation, pivotal quantity method, large-sample confidence intervals. Hypothesis Testing: Neyman-Pearson lemma, significance and power, likelihood ratio test, and information criteria. Bayesian Statistics: Bayes estimation, hypothesis testing, and model selection.
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 mathematical techniques and how the techniques can be applied to solving 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.

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)				
		a	b	c	d	e
1. Assignments	12%	✓	✓	✓	✓	✓
2. Mid-term test	28%	✓	✓	✓		
3. Examination	60%	✓	✓	✓	✓	✓
Total	100 %					

Assessment Methods in Alignment with Intended Learning Outcomes

Continuous Assessment comprises of assignments and a mid-term test. A written examination is held at the end of the semester.

Student Study Effort Required

Class contact:	
▪ Lecture	26 Hrs.
▪ Tutorial	13 Hrs.
Other student study effort:	
▪ Assignment/Mini-project	35 Hrs.
▪ Self-study	63 Hrs.
Total student study effort	137 Hrs.

Reading List and References

Hogg, R.V., McKean, J.W. and Craig, A.T.	Introduction to Mathematical Statistics, 7th Edition	Pearson / Prentice Hall, 2013
Casella, G. and Berger, R.L.	Statistical Inference, 2nd Edition	Duxbury / Thomson Learning, 2002
Hogg, R.V. and Tanis, E.A.	Probability and Statistical Inference, 8th Edition	Prentice Hall, 2009
Garthwaite, P.H., Jolliffe, I. and Jones, B.	Statistical Inference, 2nd Edition	Oxford University Press, 2002
Mood, A.M., Graybill, F.A. and Boes, D.C.	Introduction to the Theory of Statistics, 3rd Edition	McGraw-Hill, 1974