

Subject Description Form

Subject Code	AMA2634
Subject Title	Introduction to Statistics
Credit Value	3
Level	2
Pre-requisite	Basic Statistics I (AMA1006) or equivalent
Exclusion	Introduction to Statistics (AMA2634A)
Objectives	This subject is to introduce to the students the compilation of statistical data, elements of probability and probability distribution. Basic elements of statistical methods would also be introduced.
Intended Learning Outcomes	<p>Upon satisfactory completion of the subject, students should be able to:</p> <ol style="list-style-type: none"> a. Apply the knowledge of descriptive statistics to the organization and interpretation of data. b. Find confidence intervals for the sample means, sample variances and sample proportions. c. Discuss the concept of Type I and Type II error, one-sided and two sided tests. d. Apply the concept of hypothesis testing to simple statistical problems. e. Use the Chi-square distribution to solve goodness of fit problem and test for independence in contingency tables. f. Carry out nonparametric tests for simple statistical problems. g. Evaluate the expectation and variances of the linear combination of several independent random variables.
Subject Synopsis/ Indicative Syllabus	<p><i>Descriptive Statistics (4 hours)</i> Frequency distributions: construction and uses of frequency tables. Measures of central tendency: arithmetic mean, median, mode. Measures of variability: range, percentiles, quartile deviation, mean deviation, variance, standard deviation, coefficient of variation.</p> <p><i>Useful Distributions in Statistical Inference (6 hours)</i> Definitions of normal, t, F and chi-square distributions; familiarization with the relationships between these distributions and the use of corresponding tables.</p> <p><i>Estimation of Parameters (9 hours)</i> Point and interval estimates of a mean and the difference between two means, a proportion and the difference between two proportions, a variance and the ratio of two variances. Sample size required for a specified precision in an estimate.</p> <p><i>Test of Hypotheses (11 hours)</i> Statistical hypotheses and their tests. Type I and type II errors. One-sided and two-sided tests. Tests of significance; levels of significance; test statistics; critical</p>

	<p>regions. Tests for an assumed mean, the difference between two means, an assumed proportion, the difference between two proportions, an assumed variance, and the ratio of two variances. The use of chi-square tests for goodness of fit and for independence; contingency tables.</p> <p><i>Nonparametric Tests (5 hours)</i> The sign test, the signed rank test, and the rank sum test.</p> <p><i>Joint Probability Distribution (4 hours)</i> Joint distribution of two random variables: discrete, and continuous. Mean and variance of linear combination of several independent random variables.</p>																																																					
<p>Teaching/Learning Methodology</p>	<p>The subject will be delivered mainly through lectures and tutorials. The lectures will be conducted to introduce the basic statistics concepts of the topics in the syllabus, which are then reinforced by learning activities including demonstration, tutorial exercise and assignments.</p>																																																					
<p>Assessment Methods in Alignment with Intended Learning Outcomes</p>	<table border="1" data-bbox="464 831 1433 1160"> <thead> <tr> <th rowspan="2">Specific assessment methods</th> <th rowspan="2">% weighting</th> <th colspan="7">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th>e</th> <th>f</th> <th>g</th> </tr> </thead> <tbody> <tr> <td>1. Assignments/Quizzes</td> <td>20%</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> </tr> <tr> <td>2. Tests</td> <td>20%</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3. Examination</td> <td>60%</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>Total</td> <td>100 %</td> <td colspan="7"></td> </tr> </tbody> </table> <p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: The subject focuses on knowledge, skill and understanding of <u>Introduction to Statistics</u>, thus, <u>Exam-based assessment</u> is the most appropriate assessment method, including 20% test and 60% examination. Moreover, 20% worth of assignments and quizzes are included as a component of continuous assessment so as to keep the students in progress. Continuous Assessment comprises of assignments and/or quizzes, and tests. A written examination is held at the end of the semester.</p>		Specific assessment methods	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)							a	b	c	d	e	f	g	1. Assignments/Quizzes	20%	✓	✓	✓	✓	✓	✓		2. Tests	20%	✓	✓	✓					3. Examination	60%	✓	✓	✓	✓	✓	✓	✓	Total	100 %							
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Reading List and References	<u>References:</u>		
	Johnson, R., Miller, I. and Freund, J.E.	Miller & Freund's Probability and Statistics for Engineers 9 th edition	Pearson 2016
	Wackerly, D.D., Mendenhall, W., & Scheaffer, R.L.	Mathematical Statistics with Applications 7 th edition	Duxbury Press 2007
	Montgomery, D.C. and Runger, G.C.	Applied Statistics and Probability for Engineers 7 th edition	Wiley 2017
	Keller, G.	Statistics for Management and Economics 10 th edition	Cengage Learning 2014
Anderson, D.R., Sweeney, D. J. & Williams, T.A.	Statistics for Business and Economics 11 th edition	Thomson South-Western 2011	