

Subject Description Form

Subject Code	AMA3011
Subject Title	Bio-data Processing and Analysis
Credit Value	3
Level	3
Pre-requisite	AMA1006 – Basic Statistics
Objectives	This subject aims at developing the practical skills of drawing scientific conclusion from a variety of biological data. Data analysis software, like SPSS or Excel is also introduced. Applications to the real data in medicine and genetics studies is also discuss.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: <ul style="list-style-type: none"> a) analyze the biological data collected from observations and experiments b) understand the difference between observed data and experimental data in establishing causality c) understand the caveat of data analysis methods and the potential pitfalls in drawing conclusions d) present and interpret the analysis results e) use statistical packages like SPSS or Excel for data analysis
Subject Synopsis/ Indicative Syllabus	<p>Summarizing data Frequency table, histogram, cumulative distribution, percentile, measures of central tendency and variation, covariance and correlation.</p> <p>Properties of biological traits and measurement errors Bell-shaped distribution pattern appeared in measurement error and biological traits data, e.g., height, weight, arm length, etc., Normal distribution table.</p> <p>Estimation method Point and interval estimations for biological research, estimating the population size via capture-recapture method, estimating the prevalence rate of a gene type,</p>

	<p>the precision of the estimation, effect of sample size on the precision.</p> <p>Hypothesis testing Example of hypothesis testing problem in medicine and genetics studies, the concepts of type I error and type II error, one-sided and two-sided tests, level of significance, comparison of two samples, one-way ANOVA, goodness of fit test.</p> <p>Interpretation of data Experimental data Vs observational data, pitfalls in drawing conclusions about causality.</p>							
Teaching/Learning Methodology	Learning outcomes a-c will be achieved via lectures / tutorials. Learning outcome d will be achieved via mini-projects. Learning outcome e will be accomplished through tutorial classes and computer lab sessions.							
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. Assignment	10%	✓	✓	✓	✓	✓	
	2. Group Project	20%	✓	✓	✓	✓	✓	
	3. Midterm	30%	✓			✓		
	4. Final Examination	40%	✓	✓	✓	✓		
	Total	100 %						
Student Study Effort Expected	Class contact:							
	▪ Lecture						28 Hrs.	
	▪ Tutorial						14 Hrs.	
	Other student study effort:							
	▪ Assignment and mini project						30 Hrs.	
	▪ Self-study						36 Hrs.	
	Total student study effort						108 Hrs.	
Reading List and References	Reference:							

	Walpole, Myers, Myers, and Ye, Probability & statistics for engineers & scientists, 9 th Ed.
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