

1.	Name of Course/Module	Probability and Biostatistics	
2.	Course Code	HEM2019	
3.	Status of Subject	Core for B. Sc Bioinformatics	
4.	MQF Level/Stage	Bachelor Degree – MQF Level 6	
5.	Version (state the date of the last Senate approval)	June 2012	
6.	Requirement for Registration	TMT1171 Mathematical Techniques I	
7.	Name(s) of academic/teaching staff	Dr Ng Chong Han Cheong Soon Fatt	
8.	Semester and Year offered	Trimester 2 (Gamma level)	
9.	Objective of the course/module in the programme :		
	To provide a basic knowledge of probability and biostatistics and applications.		
10.	Learning Outcomes :		
	At the completion of the subject, students should be able to:		
	LO1: Apply basic concepts of probability to make statistical inference (Cognitive, Level 3)		
	LO2: Apply basic concepts of statistics to make estimates and test hypothesis for sample data (Cognitive, Level 5)		
	LO3: Apply concepts of regression and correlation for data analysis (Cognitive, Level 3)		
	LO4: Understand and explain the concepts of ANOVA techniques and its application (Cognitive, Level 6)		
11.	Synopsis:		
	Introduction to descriptive and probability with emphasis on data presentation. Exercise in numerical summary measures using different life tables and diagnostic tests. Detailed analysis of summary measures and probability including rates and standards. Understanding normal, binomial and Poisson distribution with biological data. Concepts of sample size and distribution with hypothesis testing. Detailed analysis of various regressions such as simple linear regression and multiple regression		
	Pengenalan kepada diskriptif dan kemungkinan dengan penekanan kepada penyampaian data. Latihan dalam pengukuran rumusan berangka dengan menggunakan pelbagai "life table" dan "diagnostic test". Analisa mendalam pengukuran rumusan dan kemungkinan termasuk kadar dan piawaian. Pemahaman tentang penyebaran normal, binomial dan Poisson dengan data biologi. Konsep tentang saiz sample dan penyebaran dengan hipotesis ujian. Analisa mendalam tentang pelbagai kemerosotan seperti "simple linear regression dan multiple regressions		
12.	Mapping of Subject to Programme Outcomes :		
	Programme Outcomes		% of Contribution
	PO1: Apply soft skills in work and career related activities		50.00
	PO2: Demonstrate knowledge and understanding of fundamental concepts, principles and best practices		50.00
13.	Assessment Methods and Types :		
	Method and Type	Description/Details	Percentage
	Test		25%
	Quiz		10%
	Assignment	Report & Presentation	15%
	Final Exam		50%
14.	Details of Subject		

	Topics	Mode of Delivery	
		Lecture	Tutorial
	1. Probability Definition of probability Basic Probability Theory Discrete Probability Function Continuous Probability Function	4	2
	2. Sampling Distribution and point estimation Sampling distribution, central limit theorem, approximation of discrete estimation: confidence intervals for mean, variances and proportions	4	2
	3. One- and Two-sample Tests of Hypothesis Null and alternative hypothesis. Single sample mean test, two sample mean test, single sample proportion, p , one- and two sample test for variance. Chi square statistics and contingency table	4	2
	4. Statistical Principle of Design Methods for data collection (Census, Sample survey, Observational studies, Experimental studies), Control: Control group, placebo and blinding, Restricted randomization: Blocking & Stratification, Confounding, Replication, Factorial Design, Sampling concerns Common Warning Signs in Experimental Design and Interpretation of Experiment, General guidelines	2	1
	5. Regression and correlation Simple and linear regression, least square method, correlation, multiple regression	4	2
	6. The Analysis of Variance Analysis of variance technique, one-way analysis of variance, Multiple comparisons: Tukey's test, Duncan test, Randomized complete block designs, Two-factor analysis of variance	4	2
	7. Non parametric test The sign test, The Wilcoxon Signed-Rank test for location, odds ratio and relative risk	2	1
	Total	24	12
15.	Tutorials <ul style="list-style-type: none"> • Probability • Sampling Distribution and point estimation • One- and Two-sample Tests of Hypothesis • Statistical Principle of Design • Regression and correlation • The Analysis of Variance • Non parametric test 		
16.	Total Student Learning Time (SLT)	Face to Face (Hour)	Total Guided and Independent Learning
	Lecture	24	24
	Tutorials	12	12
	Laboratory/Practical	-	-
	Presentation	1	3
	Assignment	-	10
	Mid Term Test	2	10
	Final Exam	2	20
	Quizzes	2	2
	Sub Total	41	81
Total SLT	$122/40 = 3.05 \Rightarrow 3$		

17.	Credit Value	3
18.	Reading Materials :	
	Textbook	Reference Materials
	<ol style="list-style-type: none"> 1. <i>Biostatistics: Basic concepts and methology for the Health Sciences</i>, Wayne W. Daniel, John Wiley & Sons, ISBN:978-0-470-41333-3. 2010. 2. <i>Biostatistics for Health Sciences</i>, R.Clifford Blair and Richard A. Taylor, prentice Hall, ISBN 0-13-233583-2, 2007. 	<ol style="list-style-type: none"> 1. Statistics for the life sciences, Myra Samuels and Jeffrey Witmer, Pearson Education, ISBN:013041316-X
19.	Appendix (to be compiled when submitting the complete syllabus for the programme) :	
	<ol style="list-style-type: none"> 1. Mission and Vision of the University and Faculty 2. Mapping of Programme Objectives to Vision and Mission of Faculty and University 3. Mapping of Programme Outcome to Programme Objectives 4. Progarmme Objective and Outcomes (Measurement and Descriptions) 	