

SUMMARY OF INFORMATION ON EACH COURSE

1.	Name of Course	Biochemistry I								
2.	Course Code	HBC1011								
3.	Status of Course [Applies to (cohort)]	Specialisation core for B. Sc (Hons) Bioinformatics								
4.	MQF Level/Stage	Bachelor – MQF Level 6								
5.	Version (State the date of the Senate approval – history of previous and current approval date)	Date of previous version : Jun 2014 Date of current version : Apr 2016								
6.	Pre-Requisite	None								
7.	Name(s) of academic/teaching staff	Tan Chai Hong Amelia Kassim Dr Ng Chong Han								
8.	Semester and Year offered	Trimester 1, Year 1								
9.	Objective of the course in the programme : 1. To introduce and provide the basic principles of biochemistry. 2. To provide basic theoretical knowledge and application of the various components of biochemistry such as bioenergetics, enzymology, metabolism and synthesis of molecules. 3. To provide an appreciation of the necessity of biochemical knowledge in various biomedical field.									
10.	Justification for including the course in the programme : This subject provides fundamental knowledge required for bioinformatics students to learn the structural and chemical properties of the major biological molecules.									
11.	Course Learning Outcomes :		Domain			Level				
	LO1 Comprehend the structural and chemical properties of the major biological molecules		Cognitive			Level 2				
	LO2 Explain the laboratory methods used in proteomics and genomics research		Cognitive			Level 2				
	LO3 Explain the basic concept of enzymes, its kinetics, catalytic and regulatory strategies		Cognitive			Level 2				
	LO4 Apply basic skills in handling laboratory equipment , biochemistry experiments and online biological data mining		Cognitive			Level 3				
12.	Mapping of Learning Outcomes to Programme Outcomes :									
	Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
	LO1		x							
	LO2		x							
	LO3		x							
LO4	x	x								
13.	Assessment Methods and Types :									

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Method and Type		Description/Details				Percentage
Tests		Written tests				20%
Quizzes		Written quizzes				10%
Assignment		Group presentation and report				10%
Lab		Lab report				10%
Final Exam		Written final exam				50%
14.	Mapping of assessment components to learning outcomes (LOs)					
	Assessment Components	%	LO1	LO2	LO3	LO4
	Test	20%	25	22.2	25	
	Quizzes	10%	12.5	11.1	12.5	
	Assignment	10%		11.1		
	Lab	10%				100
	Final Exam	50%	62.5	55.6	62.5	
15.	Total					
	Topics	Mode of Delivery				
		Lec	Tut	Lab		
	1. Introduction to Biochemistry <ul style="list-style-type: none"> • History of Biochemistry • Biomolecules • Biochemistry and the Genomic Revolution • Overview of Cell Structure 	1	1	3		
	2. Biochemical Evolution <ul style="list-style-type: none"> • Key Organic Molecules • Reproduction, variation and selective pressure • Energy transformations • Cells' response to changes in their environment 	2				
	3. Water <ul style="list-style-type: none"> • Properties of water • Ionization of water • Acid base chemistry 	2				

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4. Protein Structure and Function <ul style="list-style-type: none"> • Amino acids • Primary Structure • Secondary Structure • Tertiary structure • Quaternary structure • Structure and function relationship 	3	1	3
5. Exploring Proteins <ul style="list-style-type: none"> • Protein Purification • Amino acid sequence • Peptide Synthesis • Three Dimensional Structure Determination 	3		3
6. DNA, RNA and the Flow of Genetic Information <ul style="list-style-type: none"> • Nucleic Acids • DNA Replication • Gene Expression 	2	1	3
7. Exploring Genes <ul style="list-style-type: none"> • Basic Tools of gene exploration • Recombinant DNA Technology • Gene Manipulation • Site specific mutagenesis 	2		
8. Exploring Evolution and Bioinformatics <ul style="list-style-type: none"> • Statistical analysis of sequence alignments • Evolutionary relationships 	2		
9. Enzymes: Basic Concepts and Kinetics <ul style="list-style-type: none"> • Properties of enzymes • Enzyme kinetics • Regulation • Catalytic Strategies • Regulatory strategies 	3		3

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	10. Carbohydrates: Nomenclature, Structure and Function of <ul style="list-style-type: none"> • Monoglycerides • Complex Carbohydrates • Glycoproteins • Lectins 	2	1	3
	11. Lipids and Cell Membranes <ul style="list-style-type: none"> • Structure and function of the various classes of lipids • Structure and function of biological membranes • Membrane Channels and Pumps 	3		
	12. Coenzymes and Vitamins <ul style="list-style-type: none"> • Coenzymes classification • ATP, NADP⁺, NAD⁺, FAD, FMN • Biotin, tetrahydrofolate • Lipid vitamins • Ubiquinone • Cytochromes 	1		
	Total	26	4	18
16.	Laboratory Lab 1: General Laboratory Procedures Lab 2: Purification and Analysis of Biomolecules by Chromatography Lab 3: Characterization of Biomolecules by Electrophoresis Lab 4: Analysis of Biomolecules by Spectrophotometry Lab 5: Enzyme Kinetics Lab 6: Computational Analysis of Biomolecules			
17.	Total Student Learning Time (SLT)	Face to Face (Hour)	Total Guided and Independent Learning	
	Lecture	26	26	
	Tutorials	4	4	
	Laboratory/Practical	18	9	
	Presentation	-	-	
	Assignment	-	10	
	Mid Term Test	1	3	

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	Final Exam	2	15
	Quizzes	2 times	2
	Sub Total	51	69
	Total SLT	120	
18.	Credit value	3	
19.	Reading Materials		
	Textbook		
	Jeremy M. Berg, John L. Tymoczko and Lubert Stryer. "Biochemistry". 7th Edition. WH Freeman, New York, 2012.		
	Reference Material (including 'Statutes' for Law)		
	Moran, Horton, Scrimgeour, and Perry "Principles of Biochemistry," 5th Edition. Pearson, 2012.		

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Appendix (to be compiled when submitting the complete syllabus for the programme) :

1. Mission and Vision of the University and Faculty
2. Programme Objectives or Programme Educational Objectives
3. Programme Outcomes (POs)
4. Mapping of POs to the 8 MQF domain
5. Summary of the Bloom's Taxonomy's Domain Coverage in all the Los in the format below :

Subject	Learning Outcomes (please state the learning outcomes)	Bloom's Taxonomy Domain		
		Affective	Cognitive	Psychomotor
ABC1234	Learning Outcome 1			
	Learning Outcome 2			
	Learning Outcome 3			
	Learning Outcome 4			
DEF5678	Learning Outcome 1			
	Learning Outcome 2			
	Learning Outcome 3			
	Learning Outcome 4			

6. Summary of LO to PO measurement
7. Measurement and Tabulation of result for LO achievement
8. Measurement Tabulation of result for PO achievement