

1.	Name of Course/Module	Cell Biology
2.	Course Code	HCB1019
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	NONE
7.	Name(s) of academic/teaching staff	Leila Hilout Amelia Kassim Ong Chia Sui
8.	Semester and Year offered	Trimester 1 (Beta level)
9.	Objective of the course/module in the programme :	
	<ol style="list-style-type: none"> 1. To give an overview of the basic structure, function and organization of cells and sub-cellular organelles 2. To introduce the biology of cells at the level of the molecule with focus on genomic structure and function 3. To show the relationships of cells with one another and with the surrounding tissue environment 4. To introduce the cell cycle control 	
10.	Learning Outcomes :	
	<p>At the completion of the subject, students should be able to:</p> <p>LO1: Describe the basic structural and functional features common to cells and how they differentiate (Cognitive, Level 1)</p> <p>LO2: Comprehend the inter-cellular communication and interaction with the tissue environment. (Cognitive, Level 2)</p> <p>LO3: Comprehend the maintenance, expression and regulation of genome (Cognitive, Level 2)</p> <p>LO4: Describe the cell cycle and appreciate the complexity of cell cycle control. (Cognitive, Level 2)</p>	
11.	Synopsis:	
	<p>The course will cover cell origin and evolution, cellular components and functions, cellular organelles, cellular processes, cellular interaction and communication, and cellular differentiation and lineages.</p>	
	<p>Kursus ini merangkumi asal-usul sel dan evolusi, komponen-komponen sel dan fungsinya, organel sel, proses-proses dalam sel, interaksi antara sel dan komunikasi, dan pembezaan dan keturunan sel.</p>	
12.	Mapping of Subject to Programme Outcomes :	
	Programme Outcomes	% of Contribution
	PO1: Apply soft skills in work and career related activities	33.33
	PO2: Demonstrate knowledge and understanding of fundamental concepts, principles and best practices	66.67

13.	Assessment Methods and Types :		
	Method and Type	Description/Details	Percentage
	Test		10%
	Quiz		20%
	Assignment		10%
	Lab reports		10%
	Final Exam		50%
14.	Details of Subject		
	Topics	Mode of Delivery	
		Lecture	Tutorial
	1. Introduction i. Cell Evolution ii. The chemical components of a cell iii. Macromolecules: Structure, shape and information iv. How cells are studied	1	-
	2. Normal Cell Structure and Organisation i. Nucleus, nucleolus, nuclear chromatin, other intranuclear structures. ii. Cytoplasm • Mitochondria and peroxisomes • Organelles of secretion • Organelles of endocytosis iii. Cytoskeleton • Microfilaments • Microtubules • Intermediate filaments iv. Membrane system & membrane bound intracellular compartments • Membrane composition • Membrane architecture • Dynamic properties v. Other Components of the Cytosol • Lipid droplets • Glycogen deposits	3	1
3. Chemistry and Structure of DNA and RNA • Nucleotides • The structure of single stranded and double stranded DNA • The structure of RNA • Nucleases and hydrolysis of nucleic acids • Analysis of nucleic acids	2	-	

<p>4. Genomic Organization of DNA</p> <ul style="list-style-type: none"> • Viral and bacterial chromosome • Mitochondria and chloroplast DNA • Organization of DNA in chromatin • Organization of the eukaryotic genome • Genomic analysis 	2	-
<p>5. DNA Replication</p> <ul style="list-style-type: none"> • The mode of DNA replication • Synthesis of DNA in microorganisms • Eukaryotic DNA synthesis <ul style="list-style-type: none"> - Model of the replisome - Initiation and termination of DNA replication - DNA replication • DNA Sequencing 	3	1
<p>6. Transcription and RNA processing</p> <ul style="list-style-type: none"> • Types of RNA • RNA polymerase • Transcription initiation • Transcription termination • Posttranscriptional modification of RNA • Eukaryotic mRNA processing • 	3	1
<p>7. Protein Localization</p> <ul style="list-style-type: none"> • Posttranslational membrane insertion • Secretory proteins • Nuclear transport • 	1	1
<p>8. Extracellular matrix and Cellular Environment</p> <ul style="list-style-type: none"> • Collagen and elastic fibers • Ground substance 	1	-
<p>9. Cell-Cell and Cell-Matrix Interaction</p> <ul style="list-style-type: none"> • Cell adhesion molecules • Cell junctions • Information processing • Cell proliferation • Homeostasis 	2	1
<p>10. The Cell Cycle and its Regulation.</p> <ul style="list-style-type: none"> • Cell cycle events • Cell cycle control • The mechanics of cell division 	2	1

	<p>11. Cell Signaling and Communication Between Cells</p> <ul style="list-style-type: none"> • Stages of chemical signaling • Signaling mediated by intracellular receptors • Mechanism of transduction by cell surface receptor proteins • Mode of action by cyclic AMP • Communication between cells <ul style="list-style-type: none"> -Endocrine -Neural 	2	-
	<p>12. Cell Differentiation and Cell Lineages</p> <ul style="list-style-type: none"> • Molecular basis of differentiation <ul style="list-style-type: none"> ○ Generation of cell type-specific protein patterns ○ Mechanism of transcriptional control • Regulation of differentiation • Abnormal cell growth 	2	-
	<p>13. Morphology of Specialized Cells</p> <ul style="list-style-type: none"> • Relationship between type/quantity of organelle and cellular structure and function • Cells concerned with contraction and motility 	2	-
	Total	26	6
15.	Laboratory		
	Lab 1 Cell model (Animal cell, plant cell and bacteria)		
	Lab 2 Modeling: DNA Helix		
	Lab 3 DNA Extraction from Yeast, Onion and Bacteria		
	Lab 4 Modeling: DNA replication, Transcription and Protein Synthesis		
	Lab 5 Basic Light Microscopy Techniques		
	Lab 6 Introduction to Human Chromosomes		
	Lab 7 Mitosis in Onion cells		
	Lab 8 Modeling: Extra cellular Matrix / signal transduction		
16.	Total Student Learning Time (SLT)	Face to Face (Hour)	Total Guided and Independent Learning
	Lecture	26	26

	Tutorials	6	6
	Laboratory/Practical	24	12
	Presentation		
	Assignment	-	5
	Mid Term Test	1	5
	Final Exam	2	20
	Quiz	4 times	4
	Sub Total	59	78
	Total SLT	$137/40 = 3.425 \Rightarrow 3$	
17.	Credit Value	3	
18.	Reading Materials :		
	Textbook	Reference Materials	
	1. The World of Cell. 7 th Edition. Becker WM, Kleinsmith LJ and Hardin J. Pearson Benjamin Cummings. 2009.	1. Molecular Biology of the Cell. 4 th Edition. Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts and Peter Walter. Garland Publishing Inc. NY, 2002.	
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. Programme Objective and Outcomes (Measurement and Descriptions) 		