

SUMMARY OF INFORMATION ON EACH COURSE

1.	Name of Course	Bioinformatics Programming II									
2.	Course Code	HPB2021									
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: June 2014 Date of Current Version : May 2015									
6.	Pre-Requisite	HPB2011 Bioinformatics Programming I									
7.	Name(s) of academic/teaching staff	Ali AfzalianMand Mohammed Rajihuzzaman Teo Poh Nee									
8.	Semester and Year offered	Trimester 1, Year 2									
9.	Objective of the Course/Module/Subject in the Programme: 1. To introduce scripting languages commonly used in Bioinformatics 2. To introduce the techniques used for bioinformatics programming 3. To give an introduction to languages that are commonly used in writing bioinformatics software (Python, R) 4. To introduce the libraries, tools and communities of BioPython										
10.	Justification for Including the Subject in the Programme: The subject provides specific knowledge required for bioinformatics students to learn advanced aspects in bioinformatics programming.										
11.	Course Learning Outcomes :		Domain			Level					
	LO1	Define the concepts of Python and R and their programming approach	Cognitive			Level 1					
	LO2	Comprehend Python, BioPython and R basic concepts, data types, variables, methods, and apply them in developing programs.	Cognitive			Level 2					
	LO3	Analyse sequences from various biological databases using Python and BioPython	Cognitive			Level 4					
	LO4	Design a system to analyse sequence fields using Python, BioPython and XML technology	Cognitive			Level 5					
12.	Mapping of Learning Outcomes to Programme Outcomes :										
	Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	
	LO1	X									
	LO2							X	X		
	LO3							X	X		
	LO4	X						X	X		
13.	Assessment Methods and Types :										
	Method and Type	Description/Details						Percentage			
	Final Exam							40			
	Quizzes	Written quizzes						30			
	Lab Test							10			

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	Assignment	Report & Presentation				10
	Lab Reports					10
14.	Mapping of assessment components to learning outcomes (LOs)					
	Assessment Components	%	LO1	LO2	LO3	LO4
	Final Exam	40	44.5	44.5	44.5	
	Quizzes	30	33.3	33.3	33.3	
	Lab Tests	10	11.1	11.1	11.1	
	Assignment	10				50
	Lab Report	10	11.1	11.1	11.1	50
15.	Details of Course					
	Topics			Mode of Delivery		
				Lec	Lab	
	1. Python Essentials I Basic Concepts and Essentials Data Types and Variables Programming Style and Branching Files and Extensions I/O Operations Loops, Strings and Tuples			8	6	
	2. Python Essentials II GUI Development Graphics: Development and Deployment Object Oriented Programming			4	2	
	3. BioPython Basic Concepts and Essentials Data Types and Variables Connections to online databases for data retrieval Modules for sequence analyses and comparisons			8	6	
	4. R Language Basic Concepts and Essentials Data Types and Variables Use for statistical analyses Use in data mining			8	6	
	Total			28	20	

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	Total Student Learning Time (SLT)	Face to Face / Guided Learning	Independent Learning
	Lecture	28	28
	Tutorials	-	-
	Laboratory/Practical	20	10
	Assignment	-	10
	Final Exam	2	15
	Quizzes	4 times	4
	Lab tests	1	2
	Sub Total	51	69
	Total SLT	120	
16.	Credit Value	3	
17.	Reading Materials :		
	Textbooks		
	High-Performance Computational Solutions in Protein Bioinformatics (SpringerBriefs in Computer Science). Learning Python, 5th Edition, Lutz M. ISBN-13: 978-1449355739. O'Reilly Media. 2013		
	Foundational and Applied Statistics for Biologist Using R, Aho K. ISBN-13: 978-1439873380. Chapman and Hall/CRC. 2013		
	Reference Material (including 'Statutes' for Law)		
	Building Bioinformatics Solutions 2 nd edition, Bessant C, Oakley D, Shadforth I, ISBN-13: 978-0199658565. Oxford University Press. 2014		

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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