

**SUMMARY OF INFORMATION ON EACH COURSE**

1.	Name of Course	Bioinformatics Programming I								
2.	Course Code	HPB2011								
3.	Status of Course	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	TCP1121 Computer Programming								
7.	Name(s) of academic/teaching staff	Ali AfzalianMand Mohammed Rajihuzzaman								
8.	Semester and Year offered	Trimester 2, Year 1								
9.	Objective of the Course/Module/Subject in the Programme: 1. To introduce the techniques used for bioinformatics programming 2. To provide instruction on the techniques and the use of tools for assessing, searching and retrieval of information from biological databases and the submission of new entries 3. To introduce Programming languages (Java) commonly used in Bioinformatics 4. To introduce the Java tools commonly employed for analysis of data retrieved from biological databases with focus on sequence data									
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: Understand the basic concepts of bioinformatics programming, sequence analysis and protein structure prediction		Cognitive	Level 1						
	LO2: Retrieve and analyse sequences from various biological databases.		Cognitive	Level 4						
	LO3: Comprehend Java concepts (object-orientation), data types, variables, methods and apply in developing programs.		Cognitive	Level 2						
	LO4: Design a simple Bioinformatics system using Java and Bio-Java.		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		
	Assignment	Report & Presentation						10		
	Lab Reports							10		
14.	Mapping of assessment components to learning outcomes (LOs)									

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Assessment Components	%	LO1	LO2	LO3	LO4
Final Exam	40	44.5	44.5	44.5	
Quizzes	30	33.3	33.3	33.3	
Lab Test	10	11.1	11.1	11.1	
Assignment	10				50
Lab Reports	10	11.1	11.1	11.1	50
15. Details of Course					
Topics		Mode of Delivery			
		Lec	Lab		
<b>1. Bioinformatics Programming</b>					
Basic Concepts					
Data Types and Formats					
Assumptions and Realities		2		2	
NCBI Resources					
EBI Resources					
<b>2. Sequence Analysis</b>					
Alignment of Sequences-basic principles and approach: algorithms, scoring matrices, gap penalties.					
Building a Profile					
Scoring a Sequence Against a Profile.		2		4	
Reverse Complementing					
Regular Expression Motifs					
<b>3. Protein Structure Prediction</b>					
Primary, secondary, tertiary structure		2		-	
Amino-acid substitutions					
<b>4. JAVA Essentials I</b>					
Basic Concepts and Environment					
Data Types and Variables					
Programming Styles: Methods and Functional Abstraction: Strings, Statements and Control of Flow		6		4	
<b>5. JAVA Essentials II</b>					
Objects and Data Abstraction					
Object Oriented Programming					
Methods: Method Invocation, Static Methods		6		2	
Inheritance: Wrappers, Multiple Inheritance instances					

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<b>6. Biojava</b>			
Basic Concepts and Environment Simple implementations Application to Bioinformatics problems like sequence analyses		6	4
<b>7. Application in Bioinformatics</b>			
Basic Concepts. Data Types and Formats. Assumptions and Realities Bioinformatics Scripts. Format Conversion. Parsing Database Records. Internal Representation.		4	4
<b>Total</b>		<b>28</b>	<b>20</b>
	<b>Total Student Learning Time (SLT)</b>	<b>Face to Face / Guided Learning</b>	<b>Independent Learning</b>
	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	<b>120</b>	
16.	Credit Value	<b>3</b>	
17.	Reading Materials :		
	Textbooks		
	Java Software Solutions, 8 <sup>th</sup> edition, Lewis J, Loftus W, ISBN-13:978-0133594959. Addison-Wesley. 2014		
	Reference Material (including 'Statutes' for Law)		
	Building Bioinformatics Solutions 2 <sup>nd</sup> 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