ATTACHMENT 5.

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

T6. Course Specifications (CS)

Course Specifications

Institution	Date
Umm Al Qura University	
College/Department Computer and Information Systems/ Computer Science	

A. Course Identification and General Information

1. Course title and code: 14014404-3 Bioinformatics
2. Credit hours 3
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Computer Science
4. Name of faculty member responsible for the course Curriculum Committee
5. Level/year at which this course is offered 4th year / (level 9 or 10)
6. Pre-requisites for this course (if any) 14012402-4 Algorithms
7. Co-requisites for this course (if any) None
8. Location if not on main campus Al-Abidiyah campus (Boys) and Al-Zaher campus (Girls), Makkah Al Mukarramah
9. Mode of Instruction (mark all that apply)

a. traditional classroom	✓	What percentage?	100
b. blended (traditional and online)		What percentage?	
c. e-learning		What percentage?	
d. correspondence		What percentage?	
f. other		What percentage?	

Comments:

B Objectives

1. What is the main purpose for this course?
The objective of this course is to introduce students to the emerging field of bioinformatics and how computational techniques can be employed in this area. The course is aimed at computer science students to give them knowledge of 1. basic introduction to bioinformatics 2. biological databases 3. genes, genomes, mapping and DNA sequencing algorithms 4. visualization/clustering gene pattern 5. linking genes and disease
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) 1. Increase the use of the latest Web-based reference material and textbooks. 2. Review and update the course materials as part of preparation to teach this course. 3. Gather students' opinions about their success in achieving course objectives by the end of the semester. This is done through number of survey questions that map one-to-one with course objectives. 4. Review and indicate which assessment instrument(s) to be used for assessing each course outcome, and what grading rubric will be used for each instrument. 5. Staff Seminars to make them up to date with the new trends in computer science hot topics, technically and theoretically.

C. Course Description (Note: General description in the form used in Bulletin or handbook)

Course Description:

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
Introduction to bioinformatics, Gene and Genome	1	2
Biological Databases	2	2
Sequence alignment algorithms and dynamic programming	3	2
Patterns, Profiles, and Multiple Alignments	3	2
Prediction algorithms for protein structures	3	2
Microarray data analysis	2	2
Visualization/Clustering of Gene Patterns	1	2

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	30	0	30			
Credit						

3. Additional private study/learning hours expected for students per week.	4

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Students will learn basics of bioinformatics, Gene, Genome and biological databases	Course lectures, labs, tutorials, assignments, and an individual project	Quizzes, Assignments, Midterm Exam
1.2	They will learn in detail sequence alignment algorithms including patterns, profiles and multiple alignments.	Course lectures, labs, tutorials, assignments, and an individual project	Quizzes, Assignments, Midterm Exam, Final Exam, Project
1.3	Students will learn prediction algorithm for protein structures and microarray data analysis	Course lectures, labs, tutorials, assignments, and an individual project	Quizzes, Assignments, Midterm Exam, Final Exam, Project
2.0	**Cognitive Skills**		
2.1	Students will improve his/her logical thinking and reasoning in the context of neural networks	Lectures, Project, Assignments, Exams	Project, Assignments and Exams
2.2			
3.0	**Interpersonal Skills & Responsibility**		

3.1	Students will learn how to help others in the course	Encouragement to teach other students what you have learnt in the course	Project and Discussion
3.2			
4.0	**Communication, Information Technology, Numerical**		
4.1	Student will learn how to communicate their ideas to other students in the group and in the class	Group project	Group Project
4.2			
5.0	**Psychomotor**		
5.1	Demonstrate skills in using computer machines and software tools to solve computer problems.	Project and Lab assignments	Project and Lab assignments
5.2	Perform a task with minimum assistance	Project and Lab assignments	Project and Lab assignments

5. Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.) (I = Introduction P = Proficient A = Advanced)

Course LOs #	**Program Learning Outcomes (Use Program LO Code #s provided in the Program Specifications)**										
	1.1	**1.2**	**2.1**	**2.3**	**3.1**	**4.2**					
1.1	P		A			**A**					
1.2	P	**I**	A	**P**	**I**	**A**					
1.3			P	**I**		**P**					

6. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Assignments	-	0
2	Quiz 1	3	10
3	Quiz 2	7	10
4	Group Project	8	20
5	Midterm	9	20
6	Final	16	40

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

Office hours between 2-4 hours per week.

E Learning Resources

1. List Required Textbooks M. Zvelebil and J. O. Baum, Understanding Bioinformatics, Garland Science (latest edition) Arthur Lesk, Introduction to Bioinformatics, 4th edition, Oxford University Press, 2014.
2. List Essential References Materials (Journals, Reports, etc.)
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) Wing-kung sung, Algorithms in Bioinformatics: A Practical Introduction, Chapman & Hall/CRC Mathematical and Computational Biology (latest edition)
4. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Lecture room (max 40 students) Computer lab (max 20 students) Overhead projector and internet connection
2. Computing resources (AV, data show, Smart Board, software, etc.) C++ or Java to program the assignments and project

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching A student-feedback form is distributed at the end of the course.
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department
3 Processes for Improvement of Teaching 1. Feedback from the students about their understanding of the course 2. Current trends in the AI applications
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. The course materials will be regularly reviewed by the course instructor and the curriculum committee in order to keep it updated.

Name of Instructor: _____

Signature: _____ Date Report Completed: _____

Name of Course Instructor _____

Program Coordinator:_____

Signature: _____ Date Received: _____