

**ATTACHMENT 5.**

**Kingdom of Saudi Arabia**  
**The National Commission for Academic Accreditation &**  
**Assessment**

**T6. Course Specifications**  
**(CS)**

## Course Specifications

Institution	Umm Al Qura University	Date	April 15, 2016
College/Department	College of Computers and Information Systems		

### A. Course Identification and General Information

1. Course title and code: 14014703-3 Pattern Recognition			
2. Credit hours: 3			
3. Program(s) in which the course is offered: Computer Science (If general elective available in many programs indicate this rather than list programs)			
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)			
8. Location if not on main campus			
9. Mode of Instruction (mark all that apply)			
a. traditional classroom	<input checked="" type="checkbox"/>	What percentage?	<input type="text" value="100"/>
b. blended (traditional and online)	<input type="checkbox"/>	What percentage?	<input type="text"/>
c. e-learning	<input type="checkbox"/>	What percentage?	<input type="text"/>
d. correspondence	<input type="checkbox"/>	What percentage?	<input type="text"/>
f. other	<input type="checkbox"/>	What percentage?	<input type="text"/>
Comments:			

## B Objectives

<p>1. What is the main purpose for this course?</p> <p>This course introduces the fundamental concepts, theories and algorithms for pattern recognition and machine learning. It further aims to build theoretical foundation of pattern recognition and introduces its technical applications, as well.</p> <p>This field has undergone substantial development over the years. As a result, many new algorithms, techniques and tools are developed. They are used to analyze any physical phenomena and give some sort of the natural intelligence to the machine, as well. Its applications include learning, knowledge and reasoning, forecasting, optimizing, understanding natural languages, recognizing faces and speech and many more.</p>
<p>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)</p> <p>Developed by increased use of IT and web based reference materials. Improvements are as a result of new research in the field.</p>

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

<p><b>Course Description:</b></p> <p>This aim of this course is to study pattern recognition and machine learning techniques. Topics include modern statistical methodologies (Bayesian Decision Theory, Probability Theory), clustering (K-Means, Fuzzy Clustering), classifiers (Support Vector Machines, Decision Trees, Nearest Neighbour Classification), Parameter Estimation, Graphical Models (Markov Random Field), and Sequential Pattern Recognition.</p>
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1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
Statistical Analysis	3	2
Classifiers	3	2
Clustering	3	2
Parameter Estimation	2	2
Graphical Models	2	2
Sequential Pattern Recognition	2	2

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	30		30			30
Credit	1.8		1.2			3

3. Additional private study/learning hours expected for students per week.	3
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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
<b>1.0</b>	<b>Knowledge</b>		
1.1	Understanding of the fundamental pattern recognition and machine learning theories and structures	Lectures	Quizzes, Midterm and Final Exams
1.2	Ability to implement fundamental certain important pattern recognition techniques	Practical (lab) sessions	Lab Assignments and Exams
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Capability of applying the pattern recognition techniques to the application of interests	Lab Sessions	Course Project, Exams
2.2			
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1			
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1			
4.2			

<b>5.0</b>	<b>Psychomotor</b>		
5.1	Hands on experience of machine learning tools	Lab Sessions	Course Project

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	1.3	1.4	2.1	2,2	3.1	3.2	4.1	4.2	5.1
1.1	A	A									
1.2			I	P							
2.1					P						
5.1											A

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	Lab Task Completion and Assignments	2-6, 10-14	10%
2	Class Quiz	7	2.5%
3	Midterm	9	25%
4	Team Project	10	10%
5	Class Quiz	15	2.5%
6	Lab Exam	17	10%
7	Final Exam	18	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 <a href="#">Pattern Recognition and Machine Learning by Christopher Bishop (latest edition)</a>
2. List Essential References Materials (Journals, Reports, etc.) <a href="#">Pattern Recognition by Sergios Theodoridis and Konstantinos Koutroumbas (latest edition)</a>
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
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.) <a href="#">Lecture room (max 30 students) with Multimedia Projector</a> <a href="#">Computer lab (max 15 students) with Multimedia Projector</a>
2. Computing resources (AV, data show, Smart Board, software, etc.) <a href="#">Programming environment (e.g., MATLAB, Java, C++)</a> <a href="#">Machine Learning Tools (e.g. WEKA)</a>
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  Student feedback forms 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
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.

Name of Instructor: \_\_\_\_\_

Signature: \_\_\_\_\_ Date Report Completed: \_\_\_\_\_

Name of Course Instructor \_\_\_\_\_

Program Coordinator: \_\_\_\_\_

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_