

**جامعة أم القرى**

**الكلية الجامعية بالجموم**

**برنامج الماجستير في علوم الحاسب الآلي**

**المتقدمة**

#### 4. Learning and Teaching

##### 4/1 Learning Outcomes and Graduate Specifications

4/1/1 Main tracks or specializations covered by the program:

Computer science

Software Engineering

Artificial Intelligence

Computer Networks

##### 4/1/2 Curriculum Study Plan Table

Level	Num	Course Code	Course Title	Required or Elective Courses	Prerequisite	Credit Hours
Level 1 10 credit hours	1	23166101-3	Advanced Analysis of Algorithms	Required	2316318-4	3
	2	23166102-3	Advanced Operating Systems	Required	2316411-3	3
	3	23166103-3	Web Architecture and Design	Required	2316413-3	3
	4	23166104-1	Seminar	Required		1
Level 2 12 credit hours	Elective Course 1			Elective		3
	Elective Course 2			Elective		3
	Elective Course 3			Elective		3
	One of the following courses					
	5	23166201-3	Mathematical Modeling and Simulation	Required		3
6	23166202-3	Computational Modeling				
7	23166203-3	Networks 1	2316517-3			
Level 3 18 credit hours	Elective Course 4			Elective		3
	Elective Course 5			Elective		3
	Elective Course 6			Elective		3
	8	23166310-9	Research Methods	Required		3
Level 4 9 credit hours	9	23166401-9	Thesis	Required		6

**Elective courses list:**

Num	Level	Course Code	Title	Credits	Prerequisite
10	2	23166204-3	Advanced Programing Languages	3	2316331-4
11		23166205-3	Advanced Topics in Computer Graphics	3	2316430-3
12		23166206-3	Advanced Topics in Computing Theory	3	2316415-3
13		23166207-3	Advanced Computer Architecture	3	2316315-3
14		23166208-3	Network Engineering	3	23166203-3
15		23166209-3	Database Management Systems	3	2316435-3
16		23166210-3	Computational Intelligence	3	2316432-3
16		3	23166301-3	Networks 2	3
17	23166302-3		Fault Tolerant Systems	3	2316434-3
18	23166303-3		Advanced Expert Systems	3	2316513-3
20	23166304-3		Pattern Recognition	3	23166202-3
21	23166305-3		Computer Vision	3	2316318-4
22	23166306-3		Selected Topics	3	
23	23166307-3		Cyber Security	3	23166203-3
24	23166308-3		Bioinformatics	3	
25	23166309-3		Distributed Computing Systems	3	23166203-3 & 23166102-3

4/1/4. Course Specification:

## COURSE SPECIFICATIONS

Form

Course Title: Advanced Analysis of Algorithms

Course Code:23166101-3.

Date: 2018-11-18.	Institution: Umm Al-Qura University
College: Al-Jamoum Colleg	Department: Computer Science

### A. Course Identification and General Information

1. Course title and code: Advance analysis of algorithms, 23166101-3			
2. Credit hours: 3 Credits			
3. Program(s) in which the course is offered. Master in Advanced Computer Science (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course			
5. Level/year at which this course is offered:			
6. Pre-requisites for this course (if any): Data Structures & Algorithms (2316318-4)			
7. Co-requisites for this course (if any):			
8. Location if not on main campus: Jamoum Branch			
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom	<input checked="" type="checkbox"/>	percentage?	<input type="text" value="100%"/>
b. Blended (traditional and online)	<input type="checkbox"/>	percentage?	<input type="text"/>
c. E-learning	<input type="checkbox"/>	percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/>	percentage?	<input type="text"/>
f. Other	<input type="checkbox"/>	percentage?	<input type="text"/>
Comments:			

## B Objectives

### 1. The main objective of this course

Introduce students to the design of computer algorithms, as well as analysis of sophisticated algorithms

provide students with the ability to select algorithms appropriate to particular purpose and to apply them, recognizing the possibility that no suitable algorithm may exist.

Acquaint students with the range of algorithms that address an important set of well-defined problems, recognizing their strengths and weaknesses, and their suitability in particular contexts.

Introduce students to a new range of paradigms and techniques to design algorithms and to solve problems.

Enable students to be efficient in their work.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

Updating the materials of the course to cover the new topics of the field.

## C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

### Course Description:

Definitions of algorithms and formal models of computation; concepts of space and time; synthesis and analysis of algorithms for sorting, search graphs, set manipulation and pattern matching; NP-complete, and intractable problem.

### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Introduction to Analysis of Algorithm	Week1	3
Brute Force Method and Recursion	Week2	3
Greedy Algorithms	Week3	3
Dynamic Programming	Week4	3
Divide and Conquer Algorithm	Week5	3
Graph & AI Search Algorithm	Week6	3
Integer & Linear Programming	Week7	3
Text Processing Algorithm	Week8	3
Randomized Algorithm	Week9	3
Network Flows	Week10	3
Data Science Algorithms – I	Week11	3
Data Science Algorithm – II	Week12	3
Data Science Algorithm – III	Week13	3
Approximation Algorithm	Week14	3

2. Course components (total contact and credit hours per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	45					45
	Actual	45					45

3. Individual study/learning hours expected for students per week.

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

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

##### Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Understand advanced techniques for the design and analysis of algorithms, and explores a variety of applications.	Lectures Case Studies Presentations	Written Exams assignments Class Activities Quizzes
1.2	An ability to design computer algorithms, as well as analysis of sophisticated algorithms.		
2.0	Cognitive Skills		
2.1	Develop, analyze and compare existing algorithms for a wide variety of problems: sorting, searching, graphs, and binary search tree.	Lectures Case Studies Presentations Brainstorming	Written Exams assignments Class Activities Quizzes Observation
2.2	Predict the resources that the algorithm requires.		
3.0	Interpersonal Skills & Responsibility		
3.1	Justify and analyze algorithmic tradeoffs: time vs. space, deterministic vs. randomized, and exact vs. approximate.	Small group discussion Whole group discussion Brainstorming Presentation	Written Exams assignments Class Activities Quizzes
3.2	Write efficient algorithms of certain selected problems.		
4.0	Communication, Information Technology, Numerical		
4.1	Work cooperatively in a small group environment.	Written Exams assignments Class Activities Quizzes	Written Exams assignments Class Activities Quizzes
5.0	Psychomotor(if any)		
5.1	None		

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	First written mid-term exam	6	15%
2	Second written mid-term exam	12	15%
3	Presentation, class activities, and group discussion	Every week	10%
4	Homework assignments	After each chapter	10%
6	Final written exam	16	50%
7	total		100%

#### D. Student Academic Counseling and Support

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

#### E Learning Resources

1. List Required Textbooks  
Goodrich Michael T., Tamassia Roberto, Algorithm Design and Applications, 1st edition, Wiley & Sons Ltd., 2014, ISBN: 978-1-118-33591-8  
Jon Kleinberg, Eva Tardos., Algorithm Design, 1st edition. Pearson Education Inc., 2006, ISBN: 978-0321295354

2. List Essential References Materials (Journals, Reports, etc.)  
Jon Kleinber and Eva Tardos, *Algorithm Design*, Addison-Wesley, 2006.  
T. Cormen, C. Leiserson, R. Rivest, and C. Stein, *Introduction to Algorithms*, 3<sup>rd</sup> edition, 2009.

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

4. 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.)  
Classroom, as those that are available at Al-Jamoum Colloge

2. Technology resources (AV, data show, Smart Board, software, etc.)  
Blackboard

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

#### G Course Evaluation and Improvement Procedures

Strategies for Obtaining Student's Feedback on Effectiveness of Teaching  
Questionnaires (course evaluation) achieved by the students  
Student-faculty management meetings.

Other Strategies for Evaluation of Teaching by the Instructor or the Department  
Discussion within the staff members teaching the course  
Departmental internal review of the course.

Procedures for Teaching Development  
Periodical departmental revision of methods of teaching.  
Monitoring of teaching activates by senior faculty members.  
Training course.

Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)  
Reviewing the final exam questions and a sample of the answers of the students by others.  
Visiting the other institutions that introduce the same course one time per semester.

Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.  
Course evaluation  
Exam evaluation  
Improvement plan

Name of Course Instructor: Dr. Abdulaziz Alshaer

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

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



## COURSE SPECIFICATIONS Form

Course Title: Advanced Computing Theory  
Course Code: 23166206-3

Date: 2018-11-17	Institution: Umm Al-Qura University
College: Jamoum University College	Department: Computers Department

### A. Course Identification and General Information

1. Course title and code: Advanced theory of computing (23166206-3)			
2. Credit hours: 3			
3. Program(s) in which the course is offered. Master Program in Advanced Computer Science (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course Assigned by the Curriculum Committee			
5. Level/year at which this course is offered: 2 <sup>nd</sup> level/1 <sup>st</sup> year			
6. Pre-requisites for this course (if any): Computer Theory (2316415-3)			
7. Co-requisites for this course (if any):			
8. Location if not on main campus: Jamoum Branch			
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom	<input type="checkbox"/>	percentage?	<input type="checkbox"/>
b. Blended (traditional and online)	<input checked="" type="checkbox"/>	percentage?	<input type="checkbox" value="50%"/>
c. E-learning	<input checked="" type="checkbox"/>	percentage?	<input type="checkbox" value="20%"/>
d. Correspondence	<input checked="" type="checkbox"/>	percentage?	<input type="checkbox" value="30%"/>
f. Other	<input type="checkbox"/>	percentage?	<input type="checkbox"/>
Comments:			

### B Objectives

1. The main objectives of this course are: Introduce students to the mathematical foundations of computation including automata theory; the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability. Enhance/develop students' ability to understand and conduct mathematical proofs for computation and algorithms.
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2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

Increase learning opportunities by using the e-learning recourses of the UQU portal.

Implementing the course evaluation process to update the course materials.

### C. Course Description

#### Course Description:

This course is an elective course in the MSc program. Central to the theory of computation are the concepts of automata, formal languages, grammar, algorithms, computability, decidability, and complexity. Theory provides a simple, elegant view of the complex machine that we call a computer. Theory possesses a high degree of permanence and stability, in contrast with the ever-changing paradigms of the technology, development, and management of computer systems. Further, parts of the theory have direct bearing on practice, such as Automata on circuit design, compiler design, and search algorithms; Formal Languages and Grammars on compiler design; and Complexity on cryptography and optimization problems in manufacturing, business, and management. Last, but not least, research-oriented students will make good use of the theory studied in this course.

#### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Introduction to Challenges in Theoretical Computer Science	1	3
Reviewing basics of TOC: Automata + Computability +Complexity	2	3
Chomsky hierarchy	3	3
Recognizability Vs Decidability	4	3
Complexity	5	3
Students prepare presentations on two topics from the following: Space complexity, Randomization, Interactive Proofs, Parallel Complexity, Quantum Computing.	6 - 10	15
student selects a computational challenge and contributes to it.	11 - 15	15

#### 2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	45					45
	Actual	45					45

#### 3. Individual study/learning hours expected for students per week.

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

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

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Frame problems and representations of relevant theory of computation	Lectures Presentations	Projects assignments Class Activities
1.2	Provide a foundation and motivation for exposure computational theory		
2.0	Cognitive Skills		
2.1	Solve different analytical problems using standard techniques	Lectures Presentations Brainstorming	Projects assignments Class Activities Observation
2.2	Create a convenient computational model		
3.0	Interpersonal Skills & Responsibility		
3.1	Clearly communicate quantitative ideas both orally and in writing to a range of audiences	Small group discussion Whole group discussion Brainstorming Presentation	Projects assignments Class Activities
4.0	Communication, Information Technology, Numerical		
4.1	Effectively use professional level technology tools to support the study of computational theory	Projects assignments Class Activities	Projects assignments Class Activities
5.0	Psychomotor (if any)		
5.1	None		

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Seminars	6 - 10	30%
2	Paper	13	40%
3	End of course written exam	15	30%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)  
2-4 office hours per weeks.  
E-mail communication.

## E Learning Resources

1. List Required Textbooks Michael Sipser. Introduction to the Theory of Computation, Second Edition, Thompson Course Technology, 2006. ISBN-13 978-0-534-95097-2.
2. List Essential References Materials (Journals, Reports, etc.) Saudi Digital Library Additional required readings will be handed out in class and will be distributed at the appropriate time.
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc. UQU e-learning portal.
4. 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.) Classroom with 35 seats for students. An open computer laboratory for assignments.
2. Technology resources (AV, data show, Smart Board, software, etc.) Projectors and white boards.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) None

## G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching Course evaluation surveys.
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department None
3. Procedures for Teaching Development Course action plans.
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) Student outcomes assessment.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. The student outcomes assessment process is carried every other year.

Name of Course Instructor: Dr. Wael Abdelrahman Deabes

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

Signature: \_\_\_\_\_

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

## COURSE SPECIFICATIONS

Form

Course Title: Advanced Programming Language

Course Code: 23166204-3

Date: 2018-11-xx	Institution: Umm Al-Qura University
College: Jamoum University College	Department: Computers Department
<b>A. Course Identification and General Information</b>	
1. Course title and code: Advanced Programming Languages (23166204-3)	
2. Credit hours: 3	
3. Program(s) in which the course is offered. Master Program in Advanced Computer Science (If general elective available in many programs indicate this rather than list programs)	
4. Name of faculty member responsible for the course Assigned by the Curriculum Committee	
5. Level/year at which this course is offered: 2nd level/1st year	
6. Pre-requisites for this course (if any): Prog. Languages Design (2316331-4)	
7. Co-requisites for this course (if any):	
8. Location if not on main campus: Jamoum Branch	
9. Mode of Instruction (mark all that apply):	
a. Traditional classroom	<input checked="" type="checkbox"/> percentage? <input type="text" value="100"/>
b. Blended (traditional and online)	<input type="checkbox"/> percentage? <input type="text"/>
c. E-learning	<input type="checkbox"/> percentage? <input type="text"/>
d. Correspondence	<input type="checkbox"/> percentage? <input type="text"/>
f. Other	<input type="checkbox"/> percentage? <input type="text"/>
Comments:	

## B Objectives

To provide a solid foundation for studying advanced topics in Programming Language Specification and Design. Specifically, the student learning outcomes include:  
 Demonstration of knowledge of programming language design.  
 Creation and understanding of algebraic specification of abstract data types.  
 Developing/modifying interpreter-based specification (operational semantics) of programming languages.  
 Demonstration of knowledge of attribute grammar framework and axiomatic-basis for computer programming.  
 Exploring contemporary multi-paradigm languages (time permitting)

2. Describe briefly any plans for developing and improving the course that are being implemented.  
 Increase learning opportunities by using the e-learning recourses of the UQU portal.  
 Implementing the course evaluation process to update the course materials.

## C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

### Course Description:

This course introduces standard concepts related to the specification and design of high-level programming languages. It discusses different programming paradigms, algebraic specification and implementation of data types, and develops interpreters in Racket (Scheme) for specifying (operationally) various programming language features/constructs (spanning simple expression language to class-based object-oriented language). It also introduces attribute grammar framework that is convenient for automatic translation and axiomatic semantics formalism that assists in program verification. The programming assignments will be coded using Racket IDE.

### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Evolution of Programming Languages	1	3
Scheme Metalanguage; Recursive Definitions	2	3
Abstract Data Types: Algebraic Specs	3	3
Programming Paradigms	4	3
Abstract Syntax and its Representation	5	3
User-Defined Functions; Scoping	6	3
Implementing Recursion	7	3
Closures and Streams	8	3
Imperative Programming: Assignment	9	3
Interpreter for an Object-Oriented Language	10	3
Introduction to Attribute Grammars	11	3
Introduction to Axiomatic Semantics	12	3
Case Studies: Specification of Java	13-15	9

2. Course components (total contact and credit hours per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	45					45
	Actual	45					45

3. Individual study/learning hours expected for students per week.

5

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

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

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Frame problems and representations of relevant programming languages	Lectures Presentations	Projects assignments Class Activities
1.2	Provide a foundation and motivation for exposure programming languages		
2.0	Cognitive Skills		
2.1	Solve different analytical problems using standard techniques	Lectures Presentations Brainstorming	Projects assignments Class Activities Observation
2.2	Create a convenient attribute grammar framework for automatic translation		
3.0	Interpersonal Skills & Responsibility		
3.1	Clearly communicate quantitative ideas both orally and in writing to a range of audiences	Small group discussion Whole group discussion Brainstorming Presentation	Projects assignments Class Activities
4.0	Communication, Information Technology, Numerical		
4.1	Effectively use professional level technology tools to support the study of programming languages	Projects assignments Class Activities	Projects assignments Class Activities
5.0	Psychomotor (if any)		
5.1	None		



5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Assignments	All semester	30%
2	Project and presentation	12 - 13	30%
3	End of course written exam	15	40%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)  
2-4 office hours per weeks.  
E-mail communication.

#### E Learning Resources

- List Required Textbooks  
Friedman, Wand and Haynes: Essentials of Programming Languages. 3rd Edition. MIT Press, 2008. ISBN 0-262-06217-8
- List Essential References Materials (Journals, Reports, etc.)  
Saudi Digital Library  
Additional required readings will be handed out in class and will be distributed at the appropriate time.
- List Electronic Materials, Web Sites, Facebook, Twitter, etc.  
UQU e-learning portal.
- 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.)

- Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)  
Classroom with 35 seats for students.  
An open computer laboratory for assignments.
- Technology resources (AV, data show, Smart Board, software, etc.)  
Projectors and white boards.
- Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)  
None

#### G Course Evaluation and Improvement Procedures

- Strategies for Obtaining Student's Feedback on Effectiveness of Teaching  
Course evaluation surveys.
- Other Strategies for Evaluation of Teaching by the Instructor or the Department  
None
- Procedures for Teaching Development  
Course action plans.
- Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)



Student outcomes assessment.

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

The student outcomes assessment process is carried every other year.

Name of Course Instructor: Dr. Wael Deabes

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

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

## COURSE SPECIFICATIONS

Form

Course Title: **Mathematical Modeling and Simulation**

Course Code: **23166201-3**

Date: 2018-11-xx	Institution: Umm Al-Qura University
College: Jamoum University College	Department: Computers Department

### A. Course Identification and General Information

1. Course title and code: Mathematical Modeling and Simulation (23166201-3)			
2. Credit hours: 3			
3. Program(s) in which the course is offered: Master Program in Advanced Computer Science			
4. Name of faculty member responsible for the course: Assigned by the Curriculum Committee			
5. Level/year at which this course is offered: 2 <sup>nd</sup> level/1 <sup>st</sup> year			
6. Pre-requisites for this course (if any): None			
7. Co-requisites for this course (if any): None			
8. Location if not on main campus: Jamoum-Branch			
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom	<input checked="" type="checkbox"/>	percentage?	<input type="text" value="100"/>
b. Blended (traditional and online)	<input type="checkbox"/>	percentage?	<input type="text"/>
c. E-learning	<input type="checkbox"/>	percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/>	percentage?	<input type="text"/>
f. Other	<input type="checkbox"/>	percentage?	<input type="text"/>
Comments:			

### B Objectives

1. The main objective of this course Students continue to develop their mathematical skills in related area and applications of advanced linear algebra, simulation and modeling.
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2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

Increase learning opportunities by using the e-learning recourses of the UQU portal.

Implementing the course evaluation process to update the course materials.

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:** Vector spaces: Subspaces, Linear independence. Basis and dimension. Linear Transformations: Matrix representations, similarity, change of bases. Orthogonality: Orthogonal subspaces, inner product spaces, Gram-Schmidt orthogonalization. Eigen-values and Eigen-vectors, diagonalization, quadratic forms, positive definite matrices. Generating Uniform random variables. Methods for non-uniform random variables. Statistical hypotheses and tests. Monte Carlo Simulation. Modeling Discrete Event Systems.

**1. Topics to be Covered**

List of Topics	No. of Weeks	Contact hours
Vector spaces: Subspaces, Linear independence. Basis and dimension.	1	3
Linear Transformations: Matrix representations, similarity, change of bases.	1	3
Orthogonality: Orthogonal subspaces, inner product spaces, Gram-Schmidt orthogonalization.	1	3
Eigen-values and Eigen-vectors, diagonalization, quadratic forms, positive definite matrices.	2	6
Generating Uniform random variables	2	6
Methods for non-uniform random variables	2	6
Statistical hypotheses and tests	2	6
Monte-Carlo simulation	2	6
Modeling discrete event systems	2	6

**2. Course components (total contact and credit hours per semester):**

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45	-	-	-	-	45
	Actual	45	-	-	-	-	45
Credit	Planned	45	-	-	-	-	45
	Actual	45	-	-	-	-	45

**3. Individual study/learning hours expected for students per week.**

6

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

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 targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

##### Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Explain the fundamental concepts of advanced algebra	Lectures Presentations	assignments Class Activities
1.2	Demonstrate accurate and efficient use of advanced algebraic techniques		
2.0	Cognitive Skills		
2.1	Demonstrate capacity for mathematical reasoning through analyzing, proving and explaining concepts from advanced algebra	Lectures Presentations Brainstorming	assignments Class Activities Observation
2.2	Apply problem-solving using advanced algebraic techniques applied to diverse situations in computer science and other mathematical contexts		
3.0	Interpersonal Skills & Responsibility		
3.1	Clearly communicate quantitative ideas both orally and in writing to a range of audiences	Small group discussion Whole group discussion Brainstorming Presentation	assignments Class Activities
4.0	Communication, Information Technology, Numerical		
4.1	Effectively use professional level technology tools to support the study of mathematics and statistics	assignments Class Activities	assignments Class Activities
5.0	Psychomotor(if any)		
5.1	None		

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Assignments	All semester	10
4	Final Exam	17-18	50

## D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)
- 2-4 office hours per weeks.
- E-mail communication.

## E Learning Resources

1. List Required Textbooks  
B Said-Houari, Linear Algebra, Springer, 2017.  
J. Liesen and V. Mehrmann, Linear Algebra, Springer, 2015.  
De La Mota, I.F., Guasch, A., Mujica Mota, M., Piera, M.A., Robust Modelling and Simulation, Springer, 2017.
2. List Essential References Materials (Journals, Reports, etc.)  
Saudi Digital Library
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.  
UQU e-learning portal.
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.  
Mathematical Software Packages.

## 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.)  
Classroom with 35 seats for students.  
An open computer laboratory for assignments.
  2. Technology resources (AV, data show, Smart Board, software, etc.)  
Projectors and white boards.
  3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)  
None

## G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching  
Course evaluation surveys.
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department  
None
3. Procedures for Teaching Development  
Course action plans.
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)  
Student outcomes assessment.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.  
The student outcomes assessment process is carried every other year.

Name of Course Instructor: Dr. Abdel-Rahman Hedar

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

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

## COURSE SPECIFICATIONS

Form

Course Title: **Computational Modeling**

Course Code: 23166202-3

Date: 2018-11-xx	Institution: Umm Al-Qura University
College: Jamoum University College	Department: Computers Department

### A. Course Identification and General Information

1. Course title and code: Computational Modeling (23166202-3)			
2. Credit hours: 3			
3. Program(s) in which the course is offered: Master Program in Advanced Computer Science			
4. Name of faculty member responsible for the course: Assigned by the Curriculum Committee			
5. Level/year at which this course is offered: 2 <sup>nd</sup> level/1 <sup>st</sup> year			
6. Pre-requisites for this course (if any): None			
7. Co-requisites for this course (if any): None			
8. Location if not on main campus: Jamoum-Branch			
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom	<input checked="" type="checkbox"/>	percentage?	<input type="text" value="100"/>
b. Blended (traditional and online)	<input type="checkbox"/>	percentage?	<input type="text"/>
c. E-learning	<input type="checkbox"/>	percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/>	percentage?	<input type="text"/>
f. Other	<input type="checkbox"/>	percentage?	<input type="text"/>
Comments:			

## B Objectives

1. The main objective of this course

The course introduces Computational Modeling, principles of time series models and analysis.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

Increase learning opportunities by using the e-learning recourses of the UQU portal.  
Implementing the course evaluation process to update the course materials.

## C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:** This course introduces the concepts of Computational Modeling, which the students need for their experiments and research. It also covers theoretical concepts pertaining to handling various stochastic modeling. This course provides classification and properties of Computational Modeling, discrete and continuous time Markov chains, simple Markovian queueing models, applications of CTMC, martingales, Brownian motion, renewal processes, branching processes, stationary and autoregressive processes.

### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Introduction to stochastic process and random variables	2	6
Discrete-time Markov chains	3	9
Continuous-time Markov chains	3	9
Applications of Markov Chains	2	6
Martingales	1	3
Brownian Motion	1	3
Renewal Processes	1	3
Branching Processes, Stationary and Autoregressive Processes	2	6

### 2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45	-	-	-	-	-
	Actual	45	-	-	-	-	-
Credit	Planned	45	-	-	-	-	-
	Actual	45	-	-	-	-	-

3. Individual study/learning hours expected for students per week.

6

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies			
On the table below are the five NQF Learning Domains, numbered in the left column. Curriculum Map			
Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Understand concepts of Computational Modeling	Lectures Presentations	assignments Class Activities
1.2	Understand properties of Markov chain models		
2.0	Cognitive Skills		
2.1	Apply Markov chaining concepts to natural phenomena	Lectures Presentations Brainstorming	assignments Class Activities Observation
2.2	Create and use representations to model and interpret statistical ideas.		
3.0	Interpersonal Skills & Responsibility		
3.1	Clearly communicate quantitative ideas both orally and in writing to a range of audiences	Small group discussion Whole group discussion Brainstorming Presentation	assignments Class Activities
4.0	Communication, Information Technology, Numerical		
4.1	Effectively use professional level technology tools to support the study of statistics	assignments Class Activities	assignments Class Activities
5.0	Psychomotor(if any)		
5.1	None		
5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Assignments	All semester	10
4	Final Exam	17-18	50

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)  
2-4 office hours per weeks.  
E-mail communication.

#### E Learning Resources

1. List Required Textbooks  
Levin, David Asher, Y. Peres, and Elizabeth L. Wilmer. *Markov Chains and Mixing Times*. American Mathematical Society, 2008.  
Williams, D. *Probability with Martingales*. Cambridge University Press, 1991.



Brémaud, Pierre. *Markov Chains: Gibbs Fields, Monte Carlo Simulation, and Queues*. Springer, 2008.

2. List Essential References Materials (Journals, Reports, etc.)  
Saudi Digital Library

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.  
UQU e-learning portal.

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.  
Mathematical Software Packages.

#### 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.)  
Classroom with 35 seats for students.  
An open computer laboratory for assignments.

2. Technology resources (AV, data show, Smart Board, software, etc.)  
Projectors and white boards.

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)  
None

#### G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching  
Course evaluation surveys.

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department  
None

3. Procedures for Teaching Development  
Course action plans.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)  
Student outcomes assessment.

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.  
The student outcomes assessment process is carried every other year.

Name of Course Instructor: Dr. Alaa E. Abdel-Hakim

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

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

## COURSE SPECIFICATIONS

Form

Course Title: **Networks 1**

Course Code: **23166203-3**

<b>Date:</b> 2018-11-xx	<b>Institution:</b> Umm Al-Qura University
<b>College:</b> Jamoum University College	<b>Department:</b> Computer Department

### A. Course Identification and General Information

1. Course title and code: Networks 1 (23166203-3)			
2. Credit hours: 3			
3. Program(s) in which the course is offered: Master Program in Advanced Computer Science			
4. Name of faculty member responsible for the course: Assigned by the Curriculum Committee			
5. Level/year at which this course is offered:			
6. Pre-requisites for this course (if any): Computer Networks (2316517-3)			
7. Co-requisites for this course (if any):			
8. Location if not on main campus: Jamoum			
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom	<input checked="" type="checkbox"/>	percentage?	<input type="text" value="100"/>
b. Blended (traditional and online)	<input type="checkbox"/>	percentage?	<input type="text"/>
c. E-learning	<input type="checkbox"/>	percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/>	percentage?	<input type="text"/>
f. Other	<input type="checkbox"/>	percentage?	<input type="text"/>
Comments:			

### B Objectives

1. The main objective of this course
<ul style="list-style-type: none"> <li>Understand principles of advanced computer networks</li> <li>Understand the principles behind the Internet protocols</li> <li>Understand the main ideas behind some of the current innovations in networking including, p2p protocols, wireless access systems, and network security</li> <li>Understand the limitations of the current Internet and its service model</li> <li>Introduce students to networking research by studying a combination of classic networking research papers and papers about emerging themes in networking research.</li> </ul>

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

### C. Course Description

#### Course Description:

This course will cover the principles of networking with a focus on algorithms, protocols, and implementations for advanced networking services. It covers a brief retrospection on the design of the Internet, its basic mechanisms and protocols. A variety of ideas that were proposed to enhance the Internet will be examined. A select set of advanced topics in networking, primarily at recent and ongoing advances that includes (but not limited to) network protocols, internetworking, congestion control and quality-of-service, network security, network management, wireless and sensor networks.

#### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Introduction, network protocols	3	9
Internetworking	2	6
Congestion control and quality-of-service	2	6
Network security	2	6
Network management, wireless and sensor networks.	3	9
Any new trends from literature (varies from year to year)	3	9

#### 2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	45					45
	Actual	45					45

#### 3. Individual study/learning hours expected for students per week.

6

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

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

##### Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge</b>		
1.1	Describe the most important routing protocols	Lectures Presentations	Project assignments Class Activities
1.2	Illustrate the different methods used in network security.		

<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Design and implement methods for network management and wireless sensor networks deployment.	Lectures Presentations Brainstorming	Project assignments Class Activities Observation
2.2	Recognize the modern issues in computer networks		
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Demonstrate the ability to communicate and to discuss related topics of the course with instructor inside and outside the class	Small group discussion Whole group discussion Brainstorming Presentation	Project assignments Class Activities
3.2	Demonstrate the effectiveness of teamwork through assignments	Communication, Information Technology, Numerical	
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Effectively use professional level technology tools to check network security aspects.	Lectures Presentations	Project assignments Class Activities
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		
<b>5. Assessment Task Schedule for Students During the Semester</b>			
	<b>Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)</b>	<b>Week Due</b>	<b>Proportion of Total Assessment</b>
1	Midterm Exam 1	5-7	15%
2	Midterm Exam 2	12-13	15%
3	Assignments	All semester	10%
4	Project	14	20%
5	Final Exam	17-18	40%

## D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)
  - 2-4 office hours per weeks.
  - E-mail communication.

## E Learning Resources

1. List Required Textbooks  
J.F. Kurose, K.W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", 6<sup>th</sup> Edition, Addison-Wesley 2013.

2. List Essential References Materials (Journals, Reports, etc.)
<ul style="list-style-type: none"> <li>Published papers from the literature.</li> <li>Saudi Digital Library</li> </ul>
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
<ul style="list-style-type: none"> <li>UQU e-learning portal.</li> </ul>
4. 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.)
<ul style="list-style-type: none"> <li>Classroom with 35 seats for students.</li> <li>An open computer laboratory for assignments.</li> </ul>
2. Technology resources (AV, data show, Smart Board, software, etc.)
<ul style="list-style-type: none"> <li>Projectors and white boards.</li> </ul>
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)
<ul style="list-style-type: none"> <li>None</li> </ul>

## G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching Course evaluation surveys.
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
<ul style="list-style-type: none"> <li>None</li> </ul>
3. Procedures for Teaching Development Course action plans.
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
<ul style="list-style-type: none"> <li>Student outcomes assessment.</li> </ul>
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.
<ul style="list-style-type: none"> <li>The student outcomes assessment process is carried every other year.</li> </ul>

Name of Course Instructor: Dr. Gamal A. Elsayed

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

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

## COURSE SPECIFICATIONS

Form

### Course Title: Advanced Topics in Computer Architecture

Course Code: 23166207-3

Date: 2018-11-xx	Institution: Umm Al-Qura University
College: Jamoum University College	Department: Computers Department

#### A. Course Identification and General Information

1. Course title and code: Advanced Topics in Computer Architecture (23166207-3)			
2. Credit hours: 3			
3. Program(s) in which the course is offered: Master Program in Advanced Computer Science			
4. Name of faculty member responsible for the course: Assigned by the Curriculum Committee			
5. Level/year at which this course is offered: 2 <sup>nd</sup> level/1 <sup>st</sup> year			
6. Pre-requisites for this course (if any): Computer Architecture (2316315-3)			
7. Co-requisites for this course (if any): None			
8. Location if not on main campus: Jamoum-Branch			
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom	<input checked="" type="checkbox"/>	percentage?	<input type="text" value="100"/>
b. Blended (traditional and online)	<input type="checkbox"/>	percentage?	<input type="text"/>
c. E-learning	<input type="checkbox"/>	percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/>	percentage?	<input type="text"/>
f. Other	<input type="checkbox"/>	percentage?	<input type="text"/>
Comments:			

#### B Objectives

1. The main objective of this course
The objective of the course is to provide in-depth coverage of current and emerging trends in computer architecture focusing on performance and the hardware/software interface. The course emphasis is on analyzing fundamental issues in architecture design and their impact on application performance. To enable a better understanding of the concepts, hands-on assignments are used to explore issues in multicore and GPU architecture systems. Students have options in exploring their own interests in custom projects and assignments.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

Increase learning opportunities by using the e-learning recourses of the UQU portal.

Implementing the course evaluation process to update the course materials.

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:** Advanced Computer Architecture covers advanced topics in computer architecture focusing on multicore, graphics-processor unit (GPU), and heterogeneous SOC multiprocessor architectures and their implementation issues (architect's perspective). A range of levels are explored from deep submicron CMOS characteristics, microarchitecture, compiler optimization, parallel programming, run-time optimization, performance analysis & tuning, fault tolerance, and power-aware computing techniques

**1. Topics to be Covered**

List of Topics	No. of Weeks	Contact hours
Introduction to Computer Design and Quantitative Principles of Architecture Performance Analysis	1	3
Instruction Set Principles and Examples	1	3
Advanced Microarchitecture and Instruction-Level Parallelism	2	6
Memory-Hierarchy Design and Memory Prefetching Techniques	2	6
Thread-Level Parallelism	2	6
Data-Level Parallelism	3	9
Performance-tuning and Analysis of Modern Applications	2	6
Architecture Implementation Issues and Analysis	2	6

**2. Course components (total contact and credit hours per semester):**

		Lecture	Tutorial	Laboratory	Practical	Other	Total
Contact Hours	Planned	45	-	-	-	-	45
	Actual	45	-	-	-	-	45
Credit	Planned	45	-	-	-	-	45
	Actual	45	-	-	-	-	45

**3. Individual study/learning hours expected for students per week.**

6

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

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

**Curriculum Map**

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Understand advanced issues in design of computer processors, caches, and memory.	Lectures Presentations	assignments Class Activities
2.0	Cognitive Skills		



2.1	Analyze various performance characteristics of a computer system	Cognitive Skills	
2.2	Analyze performance trade-offs in computer design.	Lectures Presentations Brainstorming	assignments Class Activities Observation
2.3	Apply digital design techniques to the microarchitecture construction of a processor		
2.4	Gain the ability to develop parallel GPGPU solutions of CUDA and OpenCL	Interpersonal Skills & Responsibility	
2.5	Analyze hardware & software trade-offs to design the instruction set architecture (ISA) interface	Small group discussion Whole group discussion Brainstorming Presentation	assignments Class Activities
2.6	Apply knowledge of processor design to improve performance in algorithms and software systems.	Communication, Information Technology, Numerical	
3.0	Interpersonal Skills & Responsibility		
3.1	Clearly communicate quantitative ideas both orally and in writing to a range of audiences	Lectures Presentations	assignments Class Activities
4.0	Communication, Information Technology, Numerical		
4.1	Effectively use professional level technology tools to support the study of computer architecture.		
5.0	Psychomotor(if any)		
5.1	None		
<b>5. Assessment Task Schedule for Students During the Semester</b>			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Assignments	All semester	10
4	Final Exam	17-18	50

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)
  - 2-4 office hours per weeks.
  - E-mail communication.

#### E Learning Resources

1. List Required Textbooks
  - Hennessy and Patterson, Computer Architecture- A Quantitative Approach, 2011
2. List Essential References Materials (Journals, Reports, etc.)
  - Saudi Digital Library
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
  - UQU e-learning portal.



- |   |
|---|
| 4. Other learning material such as computer-based programs/CD, professional standards or regulations and software. <ul style="list-style-type: none"><li>• CUDA Programming online resources.</li></ul> |
|---|

## 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.)
---

- Classroom with 35 seats for students.
- An open computer laboratory for assignments.

2. Technology resources (AV, data show, Smart Board, software, etc.)
--

- Projectors and white boards.

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

- NVIDIA GPU equipped PC's

## G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching
---

- Course evaluation surveys.

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
--

- None

3. Procedures for Teaching Development
--

- Course action plans.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
--

- Student outcomes assessment.

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.
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- The student outcomes assessment process is carried every other year.

Name of Course Instructor: Dr. Hesham H. Amin

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

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

## COURSE SPECIFICATIONS

### Form

Course Title: **Networks 2**

Course Code: 23166301-3

<b>Date:</b> 2018-11-xx	<b>Institution:</b> Umm Al-Qura University
<b>College:</b> Jamoum University College	<b>Department:</b> Computer Department

#### A. Course Identification and General Information

1. Course title and code: Networks 2 (23166301-3)		
2. Credit hours: 3		
3. Program(s) in which the course is offered: Master Program in Advanced Computer Science		
4. Name of faculty member responsible for the course: Assigned by the Curriculum Committee		
5. Level/year at which this course is offered:		
6. Pre-requisites for this course (if any): Networks 1 (23166203).		
7. Co-requisites for this course (if any):		
8. Location if not on main campus: Jamoum		
9. Mode of Instruction (mark all that apply):		
a. Traditional classroom	<input checked="" type="checkbox"/> percentage?	<input type="text" value="100"/>
b. Blended (traditional and online)	<input type="checkbox"/> percentage?	<input type="text"/>
c. E-learning	<input type="checkbox"/> percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/> percentage?	<input type="text"/>
f. Other	<input type="checkbox"/> percentage?	<input type="text"/>
Comments:		

#### B Objectives

1. The main objective of this course
<ul style="list-style-type: none"> <li>Explore the operating principles, standards, design and configuration of WSANs.</li> <li>Future and emerging paradigms – such as Mobile Crowdsensing Systems, and technologies such as Wireless Power Transfer in ad-hoc networks will be addressed.</li> <li>Examine, from a systems perspective, the architectural factors in producing mobile and pervasive solutions, and explore technology areas such as application design.</li> <li>Introduce the key concepts of IoT, necessary in using and deploying IoT systems.</li> <li>Address Software Defined Networking, OpenFlow Switches, and Centralized / Distributed Network Control.</li> </ul>

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:**

This course will cover advanced topics in networking with a focus on algorithms, protocols, and implementations for advanced networking services. It covers an overview on the design of improved networks, their basic mechanisms and protocols. A variety of ideas that were proposed to improve and optimize the use of the network will be examined. A select set of advanced topics in networking, primarily at recent and ongoing advances that includes Wireless Networks, Internet of Things and Software Defined Network.

**1. Topics to be Covered**

List of Topics	No. of Weeks	Contact hours
<b>Wireless Networks:</b> WiMAX, Zigbee, UWB, 3G and 4G	2	6
Mobile Application platforms , Mobile IP, TCP for wireless	2	6
Multihop ad hoc networks, Capacity of ad hoc networks	1	3
<b>Internet of Things:</b> lot – Hardware, lot – Software,	2	6
lot – Technology and Protocols,	1	3
lot Common Uses: Engineering, Industry, Safety, Home and Office, Health and Medicine.	2	6
<b>Software Defined Network:</b> Limitations of Current Networks,	1	3
OS for Networks, OpenFlow Switches, Centralized/Distributed Control,	2	6
Interactive Debugging, PathDump.	2	6

**2. Course components (total contact and credit hours per semester):**

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	45					45
	Actual	45					45

**3. Individual study/learning hours expected for students per week.**

6

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

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

**Curriculum Map**

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Describe the most important routing protocols	Lectures Presentations	Project assignments Class Activities

1.2	Illustrate the different methods used in network security.		
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Design and implement methods for network management and wireless sensor networks deployment.	Lectures Presentations Brainstorming	Project assignments Class Activities Observation
2.2	Recognize the modern issues in computer networks		
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Demonstrate the ability to communicate and to discuss related topics of the course with instructor inside and outside the class	Small group discussion Whole group discussion Brainstorming Presentation	Project assignments Class Activities
3.2	Demonstrate the effectiveness of teamwork through assignments	Communication, Information Technology, Numerical	
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Effectively use professional level technology tools to check network security aspects.	Lectures Presentations	Project assignments Class Activities
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		
<b>5. Assessment Task Schedule for Students During the Semester</b>			
	<b>Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)</b>	<b>Week Due</b>	<b>Proportion of Total Assessment</b>
1	Midterm Exam 1	5-7	15%
2	Midterm Exam 2	12-13	15%
3	Assignments	All semester	10%
4	Project	14	20%
5	Final Exam	17-18	40%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)
  - 2-4 office hours per weeks.
  - E-mail communication.

#### E Learning Resources

1. List Required Textbooks  
J.F. Kurose, K.W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", 6<sup>th</sup> Edition, Addison-Wesley 2013.

- |  |
|--|
| 2. List Essential References Materials (Journals, Reports, etc.) <ul style="list-style-type: none"><li>• Published papers from the literature.</li><li>• Saudi Digital Library</li></ul> |
| 3. List Electronic Materials, Web Sites, Facebook, Twitter, etc. <ul style="list-style-type: none"><li>• UQU e-learning portal.</li></ul>  |
| 4. 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.) <ul style="list-style-type: none"><li>• Classroom with 35 seats for students.</li><li>• An open computer laboratory for assignments.</li></ul> |
| 2. Technology resources (AV, data show, Smart Board, software, etc.) <ul style="list-style-type: none"><li>• Projectors and white boards.</li></ul>  |
| 3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) <ul style="list-style-type: none"><li>• None</li></ul>   |

## G Course Evaluation and Improvement Procedures

- |   |
|---|
| 1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching<br>Course evaluation surveys.   |
| 2. Other Strategies for Evaluation of Teaching by the Instructor or the Department <ul style="list-style-type: none"><li>• None</li></ul>   |
| 3. Procedures for Teaching Development<br>Course action plans.  |
| 4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) <ul style="list-style-type: none"><li>• Student outcomes assessment.</li></ul> |
| 5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. <ul style="list-style-type: none"><li>• The student outcomes assessment process is carried every other year.</li></ul>  |

Name of Course Instructor: Dr. Kheir Eddine Bouazza

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

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

## COURSE SPECIFICATIONS

### Form

Course Title: Fault Tolerant Systems

Course Code: 23166302-3

<b>Date:</b> 2018-11-xx	<b>Institution:</b> Umm Al-Qura University
<b>College:</b> Jamoum University College	<b>Department:</b> Computer Department

#### A. Course Identification and General Information

1. Course title and code: Fault Tolerant Systems (23166302-3)		
2. Credit hours: 3		
3. Program(s) in which the course is offered: Master Program in Advanced Computer Science		
4. Name of faculty member responsible for the course: Assigned by the Curriculum Committee		
5. Level/year at which this course is offered:		
6. Pre-requisites for this course (if any): Parallel & Dist. Computers (2316434-3)		
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"/> percentage?	<input type="text" value="100"/>
b. Blended (traditional and online)	<input type="checkbox"/> percentage?	<input type="text"/>
c. E-learning	<input type="checkbox"/> percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/> percentage?	<input type="text"/>
f. Other	<input type="checkbox"/> percentage?	<input type="text"/>
Comments:		

## B Objectives

1. The main objective of this course  
Introduce students to fundamentals and principles of fault tolerance. Explain the basic hardware and software fault tolerant architectures. Provide students with the ability to model, design and evaluate fault tolerant systems.
2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

## C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

### Course Description:

This course addresses design, modeling, analysis, and integration of hardware and software to achieve dependable computing systems employing on-line fault-tolerance. It covers the concepts and terminologies of Fault-Tolerant System Design including: Reliability, Dependability, Maintainability, Redundancy, Error Detection, Error Recovery, Fault Treatment, Redundancy Management, Reliability of Distributed Systems, Recovery Strategies, Roll-back Recovery, Fail-Stop Processes, Systems Diagnosis, Case studies.

### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Terminology and definitions: Includes terms such as dependability, reliability, maintainability, availability and safety, taxonomies for dependable systems and fault models.	3	9
Design techniques for fault-tolerance: Fault tolerance is achieved by introducing redundancy in the computer system. Various redundancy configurations are described: Hardware redundancy, Software redundancy, and Information redundancy.	5	15
Error detection and recovery	2	6
Fault-tolerance in distributed systems	2	6
Dependability analysis of computer systems: Reliability block diagrams, fault-trees, Markov chain models, failure mode and effects analysis (FMEA), fault tree analysis (FTA)	3	9

### 2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	45					45
	Actual	45					45

### 3. Individual study/learning hours expected for students per week.

6

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

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

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Master the terminology of dependable computing.	Lectures Presentations	Projects assignments Class Activities
1.2	Describe the principles and properties of techniques used for error detection, error recovery and error masking in computer systems.	Whole group discussion Brainstorming Presentation	assignments Class Activities
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Design system architectures for fault-tolerant computer systems from a given requirements specification	Lectures Presentations Brainstorming	assignments Class Activities Observation
2.2	Perform probabilistic dependability analysis of fault-tolerant computer system using fault-trees, reliability block diagrams and time-continuous Markov chains.		
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Write a technical report of good quality on the topic of dependability analysis of fault-tolerant computer systems.	Small group discussion Brainstorming Presentation	assignments Class Activities
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Effectively use professional level technology tools to formulate requirements for fault-tolerant computer systems used in business, safety and mission critical applications.	assignments Class Activities	assignments Class Activities
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Assignments	All semester	10
4	Final Exam	17-18	50

#### D. Student Academic Counseling and Support

- Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)
  - 2-4 office hours per weeks.
  - E-mail communication.



## E Learning Resources

### 1. List Required Textbooks

Martin L. Shooman, Reliability of Computer Systems and Networks: Fault Tolerance, Analysis, and Design, WILEY, ISBN: 978-0-471-29342-2.

### 2. List Essential References Materials (Journals, Reports, etc.)

- Published papers from the literature.
- Saudi Digital Library

### 3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

- UQU e-learning portal.

### 4. 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.)

- Classroom with 35 seats for students.
- An open computer laboratory for assignments.

### 2. Technology resources (AV, data show, Smart Board, software, etc.)

- Projectors and white boards.

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

- None

## G Course Evaluation and Improvement Procedures

### 1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching Course evaluation surveys.

### 2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

- None

### 3. Procedures for Teaching Development Course action plans.

### 4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

- Student outcomes assessment.

### 5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

- The student outcomes assessment process is carried every other year.

Name of Course Instructor: Dr. Gamal A. Elsayed

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

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

## COURSE SPECIFICATIONS

### Form

Course Title: **Software Systems Architecture & Design**

Course Code: 23166103-3

<b>Date:</b> 2018-11-22	<b>Institution:</b> Umm Al Qura University
<b>College:</b> University Collage of Al Jamoum	<b>Department:</b> Computer Science

#### A. Course Identification and General Information

1. Course title and code: <b>Software Systems Architecture &amp; Design</b> (23166103-3)
2. Credit hours: 3
3. Program(s) MSc of Advanced Computer Science
4. Name of faculty member responsible for the course: Dr Ahmad F Subahi
5. Level/year at which this course is offered: MSc
6. Pre-requisites for this course (if any): Software Engineering (2316413-3)
7. Co-requisites for this course (if any): -
8. Location if not on main campus: AL Jamoum Campus
9. Mode of Instruction (mark all that apply): a. Traditional classroom <input checked="" type="checkbox"/> percentage? <input type="text" value="100"/> b. Blended (traditional and online) <input type="checkbox"/> percentage? <input type="text"/> c. E-learning <input type="checkbox"/> percentage? <input type="text"/> d. Correspondence <input type="checkbox"/> percentage? <input type="text"/> f. Other <input type="checkbox"/> percentage? <input type="text"/>
Comments:

## B Objectives

1. The main objective of this course

- Work in a team to deliver a new software product.
- Implement a robust architecture for a web application.
- Understand and break down requirements.
- Ensure acceptance tests are met through unit and integration tests.
- Work with APIs.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:** In this course unit students work in teams to build their own application, with a focus on software systems architecture, planning, and meeting requirements through extensive testing. Students will get to grips with the Model-View-Controller architecture through the Spring or MVC.Net web framework, integrating functionality from Twitter and Google maps, and developing their own API via the project of this course.

### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Software project planning and issue tracking	2	6
Git best practices and common Git workflows	1	3
Design patterns and common architectural patterns	2	6
Model-View-Controller architecture	2	6
User interface design	2	6
Data modelling Specification	2	6
Unit and integration testing	2	6
Internal, Consuming REST	2	6

### 2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	45					45
	Actual	45					45

3. Individual study/learning hours expected for students per week.

4 hrs

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

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 targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Plan software development activities and deal with problems and risks	Case Method & Discussion	Exams
1.2	Design a system architecture and progressively refine the system specification	Case Method & Discussion	Group project
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Design a user interface that supports the required functionality	Case Method & Discussion	Group project
2.2	Apply unit, integration and acceptance testing techniques to ensure the system meets specifications	Case Method & Discussion	Group project
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1			
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Work effectively as part of a team to build a significant software application	Case Method & Discussion	Group project
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1			

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Written Exam	7	20%
2	Group Project	14	30%
3	Final Exam	EXAM	50%

## D. Student Academic Counseling and Support

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

## E Learning Resources

1. List Required Textbooks

**Software Engineering (10th Edition), Ian Sommerville, 2015**

2. List Essential References Materials (Journals, Reports, etc.)

**Software Engineering: A Practitioner's Approach 8th Edition, Roger S. Pressman, 2014**

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

4. 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.)

Classroom (max 30 students)

2. Technology resources (AV, data show, Smart Board, software, etc.)

Data show, PC.

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

## G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

End semester surveys

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

Department and consultation committee meetings.

3. Procedures for Teaching Development

Reviewing the content annually and analyzing students feed back

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Discuss the content and students feed back in the consultation committee meeting at the beginning of every year.

Name of Course Instructor: Dr. Youseef Aid D Alotaibi

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

Signature: \_\_\_\_\_ Date Received: 22/11/2018

## COURSE SPECIFICATIONS

### Form

Course Title: Advanced Operating Systems

Course Code: 23166102-3

<b>Date:</b> 2018-11-xx	<b>Institution:</b> Umm Al-Qura University
<b>College:</b> Jamoum University College	<b>Department:</b> Computers Department

#### A. Course Identification and General Information

1. Course title and code: Advanced Operating Systems (23166102-3)		
2. Credit hours: 3		
3. Program(s) in which the course is offered: Master Program in Advanced Computer Science		
4. Name of faculty member responsible for the course: Assigned by the Curriculum Committee		
5. Level/year at which this course is offered: 1 <sup>st</sup> level/1 <sup>st</sup> year		
6. Pre-requisites for this course (if any): Operating Systems (2316411-3)		
7. Co-requisites for this course (if any): None		
8. Location if not on main campus: Jamoum-Branch		
9. Mode of Instruction (mark all that apply):		
a. Traditional classroom	<input checked="" type="checkbox"/> percentage?	<input type="text" value="100"/>
b. Blended (traditional and online)	<input type="checkbox"/> percentage?	<input type="text"/>
c. E-learning	<input type="checkbox"/> percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/> percentage?	<input type="text"/>
f. Other	<input type="checkbox"/> percentage?	<input type="text"/>
Comments:		

## B Objectives

- The main objective of this course
  - To provide students with a deep understanding of modern operating system technology, implementation techniques and research issues.

- Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)
  - Increase learning quality and opportunities by using the e-learning recourses of the UQU portal.
  - Implementing the course evaluation process to update and improve the course materials.

## C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

### Course Description:

#### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Communication in distributed systems: client-server model, remote procedure call, group communication.	2	6
Synchronization in distributed systems: synchronization of logical and physical clocks, distributed mutual exclusion, atomic transaction, deadlock management, election algorithms.	2	6
Process management: process allocation and migration, scheduling algorithms.	2	6
Distributed shared memory: definition and implementation, memory consistency.	1	3
Distributed File system: access model, sharing semantics, implementation, data migration and replication, consistency mechanisms.	2	6
Real-time operating systems: definition, objective and problems.	2	6
Scheduling in real time operating systems: scheduling of periodic, aperiodic and mixed tasks.	2	6
Embedded operating system: Introduction to the eCos operating system.	2	6

#### 2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	45					45
	Actual	45					45

#### 3. Individual study/learning hours expected for students per week.

6

<b>4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies</b>			
<b>On the table below are the five NQF Learning Domains, numbered in the left column.</b>			
<b>Curriculum Map</b>			
<b>Code #</b>	<b>NQF Learning Domains And Course Learning Outcomes</b>	<b>Course Teaching Strategies</b>	<b>Course Assessment Methods</b>
<b>1.0</b>	<b>Knowledge</b>		
1.1	Explain the fundamental concepts of advanced Operating Systems	Lectures Presentations	Projects assignments Class Activities
1.2	Demonstrate accurate and efficient use of advanced Operating Systems techniques	Small group discussion Whole group discussion Brainstorming Presentation	assignments Class Activities
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Demonstrate capacity for developing and modifying components of an embedded and real-time operating system.	Lectures Presentations Brainstorming	assignments Class Activities Observation
2.2	Develop programs with the awareness of how an unconventional operating system manages the resulting processes;		
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Independently pursuing the study and research in the field of distributed, embedded and real-time operating systems, addressing advanced issues in both the industrial and scientific fields.	Small group discussion Whole group discussion Brainstorming Presentation	assignments Class Activities
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Effectively carrying out a laboratory project and presenting its results, motivating the choices with language appropriateness	assignments Class Activities	assignments Class Activities
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		
<b>5. Assessment Task Schedule for Students During the Semester</b>			
	<b>Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)</b>	<b>Week Due</b>	<b>Proportion of Total Assessment</b>
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Paper Presentation	All semester	20
4	Final Exam	17-18	40

#### **D. Student Academic Counseling and Support**

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



- 2-4 office hours per weeks.
- E-mail communication.

## E Learning Resources

1. List Required Textbooks
  - Andrew S. Tanenbaum and Maarten van Steen, "Distributed Systems, Principles & Paradigms", CreateSpace Independent Publishing Platform , 2016.
2. List Essential References Materials (Journals, Reports, etc.)
  - Saudi Digital Library
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
  - UQU e-learning portal.
4. 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.)
  - Classroom with 35 seats for students.
  - An open computer laboratory for assignments.
2. Technology resources (AV, data show, Smart Board, software, etc.)
  - Projectors and white boards.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)
  - None

## G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching
  - Course evaluation surveys.
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
  - None
3. Procedures for Teaching Development
  - Course action plans.
4. Procedures for Verifying Standards of Student's Achievement
  - Student outcomes assessment.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.
  - The student outcomes assessment process is carried every other year.

Name of Course Instructor: Dr. Kheir Eddine Bouazza

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

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

## COURSE SPECIFICATIONS

### Form

Course Title: **Database Management Systems**

Course Code: 23166209-3

<b>Date:</b> 2018-11-22	<b>Institution:</b> Umm Al Qura University
<b>College:</b> University Collage of Al Jamoum	<b>Department:</b> Computer Science

#### A. Course Identification and General Information

1. Course title and code: <b>Database Management Systems</b> (23166209-3)		
2. Credit hours: 3		
3. Program(s) MSc of Advanced Computer Science		
4. Name of faculty member responsible for the course: Dr Ahmad F Subahi		
5. Level/year at which this course is offered: MSc		
6. Pre-requisites for this course (if any): Advanced Databases (2316435-3)		
7. Co-requisites for this course (if any): -		
8. Location if not on main campus: AL Jamoum Campus		
9. Mode of Instruction (mark all that apply):		
a. Traditional classroom	<input checked="" type="checkbox"/> percentage?	<input type="text" value="100"/>
b. Blended (traditional and online)	<input type="checkbox"/> percentage?	<input type="text"/>
c. E-learning	<input type="checkbox"/> percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/> percentage?	<input type="text"/>
f. Other	<input type="checkbox"/> percentage?	<input type="text"/>
Comments:		

## B Objectives

- The main objective of this course
  - introduce students to current advanced techniques, methods and results from the active field of database systems and data management.
  - Examine the construction of Database Management Systems, with advanced data structures and algorithms used to represent and manipulate data effectively.
  - Critically assess new developments in database technology.**

- Describe briefly any plans for developing and improving the course that are being implemented.

## C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

### Course Description:

In this course unit students will build a deeper and broader view of the advanced issues involved in Database Management Systems, some of the most complex software in common use. It provides a detailed insight into implementation aspects of relational systems (using Oracle environment) and expand the student knowledge on the current enhancements to different kinds of database systems by identifying trade-offs among database systems techniques and contrast alternatives for both on-line transaction processing and on-line analytical workloads.

### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Refresher on databases and modelling	1	3
Relational algebra, tuple relational calculus, SQL, and equivalences between them	1	3
<b>Advanced SQL Programming in Oracle</b>	<b>2</b>	<b>6</b>
Transaction processing, concurrency, ACID rules, OLTP	3	9
Query planning, evaluation and optimization	3	9
Data storage and indexing, B-trees and hashing	2	6
<b>Native XML Databases</b>	<b>1</b>	<b>3</b>
Non-Relational Databases	1	3
Big data, MapReduce	2	6
Database security and privacy,	2	6

### 2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	31			28		45
	Actual	31			28		45
Credit	Planned	31			14		45
	Actual	31			14		45

**3. Individual study/learning hours expected for students per week.**

4 hrs

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

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

**Curriculum Map**

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	demonstrate knowledge and understanding of the issues involved in developing database management software	Case Method & Discussion	Exams
1.2	demonstrate knowledge and understanding of the variety of available DBMS types and the circumstances in which they are appropriate	Case Method & Discussion	Exams
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Demonstrate how a DBMS processes, optimizes and executes a query	Case Method & Discussion	Exams
2.2	Choose appropriate approaches for data storage and access	Case Method & Discussion	Group project
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1			
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Work effectively as part of a team to build an appropriate DBMS for an application	Case Method & Discussion	Group project
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		

**5. Assessment Task Schedule for Students During the Semester**

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Written Exam	8	25%
2	Group Project	14	25%
3	Final Exam	EXAM	50%

**D. Student Academic Counseling and Support**

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

## E Learning Resources

1. List Required Textbooks <b>Elmasri, R. and Navathe, S.B., (2004). Fundamentals of Database Systems.</b>
2. List Essential References Materials (Journals, Reports, etc.) <b>Garcia-Molina, H., Ullman, J.D. and Widom J. (2009). Database Systems: The Complete Book.</b>
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
4. 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.) Classroom (max 30 students)
2. Technology resources (AV, data show, Smart Board, software, etc.) Data show, PC.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

## G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching End semester surveys
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department Department and consultation committee meetings.
3. Procedures for Teaching Development Reviewing the content annually and analyzing students feed back
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. Discuss the content and students feed back in the consultation committee meeting at the beginning of every year.

Name of Course Instructor: Dr. Ahmad F Subahi

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

Signature: \_\_\_\_\_ Date Received: 22/11/2018

## COURSE SPECIFICATIONS

### Form

Course Title: **Computational Intelligence**

Course Code: 23166210-3

<b>Date:</b> 2018-11-22	<b>Institution:</b> Umm Al Qura University
<b>College:</b> University Collage of Al Jamoum	<b>Department:</b> Computer Science

#### A. Course Identification and General Information

1. Course title and code: Computational Intelligence (23166210-3)
2. Credit hours:
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course
5. Level/year at which this course is offered:
6. Pre-requisites for this course (if any): Intro. to Artificial Intelligence (2316432-3)
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"/> percentage? <input type="text" value="100"/>
b. Blended (traditional and online) <input type="checkbox"/> percentage? <input type="text"/>
c. E-learning <input type="checkbox"/> percentage? <input type="text"/>
d. Correspondence <input type="checkbox"/> percentage? <input type="text"/>
f. Other <input type="checkbox"/> percentage? <input type="text"/>
Comments:

## B Objectives

1. The main objective of this course

The field of Computational Intelligence has undergone a phenomenal change in the last 5-6 years with the advent of Deep Learning. Deep learning applications have transformed computer vision, natural language processing and machine translation, and matured the field to the point of massive industry adoption. This course introduces the fundamental background and the main architectures of deep learning, along with applications.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

The course will be taught with an application perspective, with a focus on implementing the techniques discussed theoretically in the lectures.

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

### Course Description:

Deep Learning has transformed AI in recent years. The fundamentals of Deep Learning are based on neural network architectures and their learning techniques. This course introduces both the theory and practice of Deep Learning, as being the most important technique in AI in current times.

### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Introduction to Deep Learning, building intelligent machines, Challenges in Machine Perception	2	6
Basics of Neural Networks Linear Discriminant Functions, Perceptron, Training a perceptron, Feed Forward Neural Networks, Limitations of Linear Machines, Non-Linear Activation Functions, Error Functions, Softmax	2	6
Training Feed Forward Networks, Gradient Descent, Stochastic Gradient Descent, Back Propagation Algorithm, Test Sets, Validation, Overfitting, Hyper Parameters	3	9
Training Techniques: Regularization, Momentum, Adaptive Methods	2	6
Convolutional Neural Networks	2	6
Embedding and Representation Learning, Lower Dimensional Representations, PCA, Auto-Encoders	2	6
Overview of Applications and Examples	2	6

### 2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	45					45
	Actual	45					45

### 3. Individual study/learning hours expected for students per week.

6

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

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 targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

##### Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	demonstrate knowledge and understanding of the issues involved in developing Artificial Intelligence techniques	Case Method & Discussion	Exams
1.2	Provide a foundation and motivation for exposure to Artificial Intelligence algorithms	Case Method & Discussion	Group project
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Solve different intelligent problems using standard techniques	Case Method & Discussion	Exams
2.2	Choose appropriate approaches for developing intelligent algorithms	Case Method & Discussion	Group project
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Learn how to communicate quantitative ideas both orally and in writing to a range of audiences		
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Work effectively as part of a team to build an appropriate intelligent application	Case Method & Discussion	Exams
4.2	demonstrate knowledge and understanding of the issues involved in developing complex intelligent application	Case Method & Discussion	Group project
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Assignments	All semester	20
2	Project and presentation	15-16	40
3	Final Exam	17-18	40

#### D. Student Academic Counseling and Support

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



## E Learning Resources

### 1. List Required Textbooks

- Primary Text: Nikhil Buduma, “Fundamentals of Deep Learning: Designing Next Generation Machine Learning Algorithms”, O’Reilly, 2017
- Reference Text: Josh Patterson, Adam Gibson, “Deep Learning: A Practitioner’s Approach” O’Reilly, 2017

### 2. List Essential References Materials (Journals, Reports, etc.)

### 3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

### 4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

MATLAB , with MatConvNet

## 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.)

- Classroom, with multimedia projector, and access to MATLAB software.

### 2. Technology resources (AV, data show, Smart Board, software, etc.)

- multimedia projector, and computer with access to MATLAB software.

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

## G Course Evaluation and Improvement Procedures

### 1. Strategies for Obtaining Student’s Feedback on Effectiveness of Teaching

### 2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

### 3. Procedures for Teaching Development

### 4. Procedures for Verifying Standards of Student’s Achievement (e.g. check marking by an independent member teaching staff of a sample of student’s work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

### 5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: Dr. Abdel-Rahman Hedar

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

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

## COURSE SPECIFICATIONS

### Form

Course Title: Advanced Expert Systems

Course Code: 23166303-3

<b>Date:</b> 2018-11-xx	<b>Institution:</b> Umm Al-Qura University
<b>College:</b> Jamoum University College	<b>Department:</b> Computers Department

#### A. Course Identification and General Information

1. Course title and code: Advanced Expert Systems (23166303-3)		
2. Credit hours: 3		
3. Program(s) in which the course is offered: Master Program in Advanced Computer Science		
4. Name of faculty member responsible for the course: Assigned by the Curriculum Committee		
5. Level/year at which this course is offered: 2 <sup>nd</sup> level/1 <sup>st</sup> year		
6. Pre-requisites for this course (if any): Expert Systems (2316513-3)		
7. Co-requisites for this course (if any): None		
8. Location if not on main campus: Jamoum-Branch		
9. Mode of Instruction (mark all that apply):		
a. Traditional classroom	<input checked="" type="checkbox"/> percentage?	<input type="text" value="100"/>
b. Blended (traditional and online)	<input type="checkbox"/> percentage?	<input type="text"/>
c. E-learning	<input type="checkbox"/> percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/> percentage?	<input type="text"/>
f. Other	<input type="checkbox"/> percentage?	<input type="text"/>
Comments:		

## B Objectives

- The main objective of this course
  - This course will investigate advanced topics in expert systems, especially as it relates to machine learning.
  - A key objective is to have students work on projects that create new research capabilities within the expert Systems and Machine Learning.

- Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)
  - Increase learning opportunities by
  - Implementing the course evaluation using the e-learning recourses of the UQU portal. process to update the course materials.

## C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:** Input patterns feature selection and how to use in several types of neural networks especially in deep learning

### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Data and feature analysis tools	3	9
Advanced topics in Neural networks	3	9
Deep learning techniques	3	9
Pattern recognition	3	9
State-of-the-art topics	3	9

### 2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45	-	-	-	-	45
	Actual	45	-	-	-	-	45
Credit	Planned	45	-	-	-	-	45
	Actual	45	-	-	-	-	45

### 3. Individual study/learning hours expected for students per week.

6

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

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

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Frame problems using multiple representations of relevant structures and relationships	Lectures Presentations	assignments Class Activities
1.2	Provide a foundation and motivation for exposure to pattern recognition algorithms	group discussion Brainstorming Presentation	assignments Class Activities
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Solve different intelligent problems using standard techniques	Lectures Presentations Brainstorming	assignments Class Activities Observation
2.2	Create quantitative models to solve real world problems in appropriate contexts		
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Clearly communicate quantitative ideas both orally and in writing to a range of audiences	Small group discussion Brainstorming Presentation	assignments Class Activities
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Effectively use professional level technology tools to support the study of intelligent systems	assignments Class Activities	assignments Class Activities
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Assignments	All semester	20
4	Final Exam	17-18	40

#### D. Student Academic Counseling and Support

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

- 2-4 office hours per weeks.
- E-mail communication.

#### E Learning Resources

1. List Required Textbooks

- Pattern Recognition and Machine Learning, Christopher Bishop, Springer-Verlag New York, 2006
- Introduction to Deep Learning: From Logical Calculus to Artificial Intelligence, Sandro Skansi, 2018

- |  |
|--|
| 2. List Essential References Materials (Journals, Reports, etc.)   |
| <ul style="list-style-type: none"> <li>• Saudi Digital Library</li> </ul>  |
| 3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.   |
| <ul style="list-style-type: none"> <li>• UQU e-learning portal.</li> </ul>   |
| 4. Other learning material such as computer-based programs/CD, professional standards or regulations and software. |
| <ul style="list-style-type: none"> <li>• Neural networks Software Packages.</li> </ul>                             |

### 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.)   |
| <ul style="list-style-type: none"> <li>• Classroom with 35 seats for students.</li> <li>• An open computer laboratory for assignments.</li> </ul>                         |
| 2. Technology resources (AV, data show, Smart Board, software, etc.)  |
| <ul style="list-style-type: none"> <li>• Projectors and white boards.</li> </ul>  |
| 3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)   |
| <ul style="list-style-type: none"> <li>• None</li> </ul>  |

### G Course Evaluation and Improvement Procedures

- |  |
|--|
| 1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching  |
| <ul style="list-style-type: none"> <li>• Course evaluation surveys.</li> </ul>   |
| 2. Other Strategies for Evaluation of Teaching by the Instructor or the Department   |
| <ul style="list-style-type: none"> <li>• None</li> </ul>   |
| 3. Procedures for Teaching Development   |
| <ul style="list-style-type: none"> <li>• Course action plans.</li> </ul>   |
| 4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) |
| <ul style="list-style-type: none"> <li>• Student outcomes assessment.</li> </ul>   |
| 5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.  |
| <ul style="list-style-type: none"> <li>• The student outcomes assessment process is carried every other year.</li> </ul>   |

Name of Course Instructor: Dr. Hesham H. Amin

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

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

## COURSE SPECIFICATIONS

### Form

Course Title: Advanced Topics in Computer Graphics

Course Code: 23166205-3

**Date:** 2018-11-20

**Institution:** Umm Al-Qura University

**College:** Jamoum University College

**Department:** Computer Science Department.

#### A. Course Identification and General Information

1. Course title and code: Advanced Topics in computer Graphics (23166205-3)

2. Credit hours: 3

3. Program(s) in which the course is offered. Master Program in Advanced Computer Science

4. Name of faculty member responsible for the course Dr. Tarik Alafif

5. Level/year at which this course is offered: 2<sup>nd</sup> or 3<sup>rd</sup> semester

6. Pre-requisites for this course (if any): Data Structures & Algorithms (2316318-4)

7. Co-requisites for this course (if any): None

8. Location if not on main campus:

Jamoum University College

9. Mode of Instruction (mark all that apply):

a. Traditional classroom

percentage?

100%

b. Blended (traditional and online)

percentage?

c. E-learning

percentage?

d. Correspondence

percentage?

f. Other

percentage?

Comments:

## B Objectives

1. The main objective of this course

This course is intended to provide a graduate-level introduction to representation of pictures from hardware and software points of view; interactive techniques and their applications; three-dimensional image synthesis techniques. Students are required to implement several algorithms covered in the course and complete a final project.

2. Describe briefly any plans for developing and improving the course that are being implemented.

- Students may involve reading current research papers related to topics, bring new ideas, and implement them.

## C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

### Course Description:

This course is intended to provide a high-level introduction to advanced graphical features for a student audience mostly trained in Java. Its accessible approach and detailed coverage include the high-level 2D Java and Java 3D APIs - offering an elegant and easy-to-understand presentation of 2D and 3D graphics without compromising the fundamental principles of the subject.

### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Overview of Computer Graphics	2	6
2D Graphics: Basics	2	6
2D Graphics: Rendering Details	1	3
2D Graphics: Advanced Topics	2	6
Basic 3D Graphics	2	6
Graphics Contents	2	6
Geometric Transformation	2	6
Views	2	6

### 2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45	----	----	----	----	45
	Actual	45	----	----	----	----	45
Credit	Planned	45	----	----	----	----	45
	Actual	45	----	----	----	----	45

3. Individual study/learning hours expected for students per week.

6 hours

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

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 targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

##### Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Knowledge of principles and concepts for specific core subject areas.	1- Lectures. 2- Conduct scientific research and the follow-up of all new topics. 3- Class discussions.	1- Assignment 2- Research 3- Project
1.2	Match the principles and the concepts to analyze problems within specific core areas		
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Discuss how to overcome educational problems.	<ul style="list-style-type: none"> <li>• Solving problems.</li> <li>• Homework.</li> <li>• Dialogues and discussions.</li> <li>• Lectures</li> <li>• Looking in the internet.</li> <li>• Using computers and software's to understand and analyze data and using simulation programs.</li> <li>• Experimental work and its outcomes.</li> </ul>	Discussion and Exam
2.2	Gains the skills of solving scientific problems related to industrial development plans and 2030 Saudi vision in the kingdom.		
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Work effectively in groups and exercise leadership when appropriate.	<ul style="list-style-type: none"> <li>• Awareness of time management in completing their projects and reports.</li> <li>• Encourage students to help each other</li> <li>• Ensure teamwork in projects</li> <li>• Whole group discussion.</li> </ul>	<ul style="list-style-type: none"> <li>• Respecting deadlines.</li> <li>• Helping each other in doing their experiments.</li> <li>• Giving clear and logical arguments</li> </ul>
3.2	Familiarity with current developments in Computer Vision.		
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Communicate effectively in oral and written form.	<ul style="list-style-type: none"> <li>• E-Learning.</li> <li>• PowerPoint Slides.</li> <li>• PDF Files.</li> </ul>	<ul style="list-style-type: none"> <li>• Written final exam.</li> <li>• E – learning programming assignments</li> </ul>
4.2	Gain the skills to use the internet tools for communications.		
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		



<b>5. Assessment Task Schedule for Students During the Semester</b>			
	<b>Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)</b>	<b>Week Due</b>	<b>Proportion of Total Assessment</b>
1	Programming Assignment 1	3	5 points
2	Programming Assignment 2	6	5 points
3	Programming Assignment 3	9	5 points
4	Programming Assignment 4	12	5 points
5	Project Presentation and Report	15	40 points
6	Final Exam	16	40 points

#### **D. Student Academic Counseling and Support**

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)  
Students can meet teaching faculty during office hours as appointed in course syllabus and door schedule.

#### **E Learning Resources**

1. List Required Textbooks  
Computer Vision: Algorithms and Applications by Richard Szeliski, Springer, 2010.

2. List Essential References Materials (Journals, Reports, etc.)  
Related research papers

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.  
None

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.  
None

#### **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.)  
Maximum number of 40 students

2. Technology resources (AV, data show, Smart Board, software, etc.)  
White board and data show

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)  
None

#### **G Course Evaluation and Improvement Procedures**

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching  
Electronic survey by the end of the course

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department  
None

- |  |
|--|
| 3. Procedures for Teaching Development<br>Involve students to read research papers and implement novel ideas in the course projects.   |
| 4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)<br>Follow up students achievement and progress by marking it on the students sheet. |
| 5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.<br>We plan to review course effectiveness and development every year and benchmark it in the same course contents and syllabus with high ranked international universities.  |

Name of Course Instructor: Dr. Tarik Alafif

Signature: \_Dr. Tarik Alafif

Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

Signature: \_\_\_\_\_

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

## COURSE SPECIFICATIONS

### Form

Course Title: Pattern Recognition...

Course Code: 23166304-3

<b>Date:</b> 2018-11-xx	<b>Institution:</b> Umm Al-Qura University
<b>College:</b> Jamoum University College	<b>Department:</b> Computers Department

### A. Course Identification and General Information

1. Course title and code: Pattern Recognition (23166304-3)		
2. Credit hours:		
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs)		
4. Name of faculty member responsible for the course		
5. Level/year at which this course is offered:		
6. Pre-requisites for this course (if any): Computational Modeling (23167103-3)		
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"/> percentage?	<input type="text" value="100"/>
b. Blended (traditional and online)	<input type="text"/> percentage?	<input type="text"/>
c. E-learning	<input type="text"/> percentage?	<input type="text"/>
d. Correspondence	<input type="text"/> percentage?	<input type="text"/>
f. Other	<input type="text"/> percentage?	<input type="text"/>
Comments:		

### B Objectives

1. The main objective of this course The main objective of the course is to understand the fundamentals of statistical pattern recognition. Statistical pattern recognition forms the backbone of modern machine learning. The course builds on basic probability and statistics, to develop an understanding of machine learning, using both parametric and non-parametric approaches.
2. Describe briefly any plans for developing and improving the course that are being implemented. The course will be taught with an application perspective, with a focus on implementing the techniques discussed theoretically in the lectures.

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:**

Statistical pattern recognition is the backbone of modern machine learning. This course builds on basic probability, statistics and linear algebra to develop the fundamental concepts of statistical pattern recognition, including Bayesian Decision Theory, feature spaces, dimensionality reduction, regression, classification, parameteric and non-parameteric techniques, linear discriminant functions, perceptron and neural networks.

**1. Topics to be Covered**

List of Topics	No. of Weeks	Contact hours
Introduction to Statistical Pattern Recognition. Pattern Recognition systems: Sensing, Feature Extraction, Classification, Post Processing Design cycle, Types of Learning	1	3
Mathematical Background Review: Probability distributions, multi-variate Gaussian distribution, Conditional density, Expected value, multiple random variables, statistical independence, covariance matrices Linear Algebra review, inner product, trace, determinant, derivatives of a matrix, eigen values and eigen vectors, matrix inversion Lagrange Optimization	1	3
Bayesian Decision Theory, discriminant functions, decision surfaces, Discriminant Functions of Normal Density,	3	9
Parametric methods, Maximum likelihood estimation	1	3
Choice of Features and Dimensionality, Curse of Dimensionality, Dimensionality Reduction, Principal Component Analysis, Fisher's Linear Discriminant	2	6
Non Parametric Methods, Parzen Density Estimate, Nearest Neighbor, K-Nearest Neighbor, Metrics and Distance Functions	2	6
Linear Discriminant Functions, Perceptron Rule, Gradient Descent, Multicategory classification	2	6
Introduction to Neural Networks, Backpropagation Algorithm	2	6

**2. Course components (total contact and credit hours per semester):**

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	45					45
	Actual	45					45

**3. Individual study/learning hours expected for students per week.**

6

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

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

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Knowledge of principles and concepts for specific core subject areas.	3- Lectures. 4- Conduct scientific research and the follow-up of all new topics. 3- Class discussions.	4- Assignment 5- Research 6- Project
1.2	Match the principles and the concepts to analyze problems within specific core areas		
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Discuss how to overcome educational problems.	<ul style="list-style-type: none"> <li>• Solving problems.</li> <li>• Homework.</li> <li>• Dialogues and discussions.</li> <li>• Lectures</li> <li>• Looking in the internet.</li> <li>• Using computers and software's to understand and analyze data and using simulation programs.</li> <li>• Experimental work and its outcomes.</li> </ul>	Discussion and Exam
2.2	Gains the skills of solving scientific problems related to industrial development plans and 2030 Saudi vision in the kingdom.		
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Work effectively in groups and exercise leadership when appropriate.	<ul style="list-style-type: none"> <li>• Awareness of time management in completing their projects and reports.</li> <li>• Encourage students to help each other</li> <li>• Ensure teamwork in projects</li> <li>• Whole group discussion.</li> </ul>	<ul style="list-style-type: none"> <li>• Respecting deadlines.</li> <li>• Helping each other in doing their experiments.</li> <li>• Giving clear and logical arguments</li> </ul>
3.2	Familiarity with current developments in Computer Vision.		
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Communicate effectively in oral and written form.	<ul style="list-style-type: none"> <li>• E-Learning.</li> <li>• PowerPoint Slides.</li> <li>• PDF Files.</li> </ul>	<ul style="list-style-type: none"> <li>• Written final exam.</li> <li>• E – learning programming assignments</li> </ul>
4.2	Gain the skills to use the internet tools for communications.		
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Midterm Exam 1	5-7	15
2	Midterm Exam 2	12-13	15
3	Project and presentation	15-16	40
4	Final Exam	17-18	30

## D. Student Academic Counseling and Support

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

## E Learning Resources

1. List Required Textbooks

Primary Text: Richard Duda, Peter Hart, and David Stork, "Pattern Classification", 2<sup>nd</sup> Ed, Wiley

Reference Text: Christopher Bishop, "Pattern Recognition and Machine Learning", Springer

2. List Essential References Materials (Journals, Reports, etc.)

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

Pattern Recognition on the Web: <http://cgm.cs.mcgill.ca/~godfried/teaching/pr-web.html>

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

- MATLAB

## 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.)

- Classroom, with multimedia projector, and access to MATLAB software.

2. Technology resources (AV, data show, Smart Board, software, etc.)  
multimedia projector, and computer with access to MATLAB software.

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

## G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

3. Procedures for Teaching Development

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: Dr. Alaa E. Abdel-Hakim M. Aly

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

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

## COURSE SPECIFICATIONS

### Form

Course Title: Computer Vision

Course Code: 23166305-3

<b>Date:</b> 2018-11-20	<b>Institution:</b> Umm Al-Qura University
<b>College:</b> Jamoum University College	<b>Department:</b> Computer Science Department.

#### A. Course Identification and General Information

1. Course title and code: Computer Vision (23166305-3)		
2. Credit hours: 3		
3. Program(s) in which the course is offered. Master Program in Advanced Computer Science		
4. Name of faculty member responsible for the course Dr. Tarik Alafif		
5. Level/year at which this course is offered: 2 <sup>nd</sup> or 3 <sup>rd</sup> semester		
6. Pre-requisites for this course (if any): Data Structures & Algorithms (2316318-4)		
7. Co-requisites for this course (if any): None		
8. Location if not on main campus: Jamoum University College		
9. Mode of Instruction (mark all that apply):		
a. Traditional classroom	<input checked="" type="checkbox"/> percentage?	<input type="text" value="100%"/>
b. Blended (traditional and online)	<input type="checkbox"/> percentage?	<input type="text"/>
c. E-learning	<input type="checkbox"/> percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/> percentage?	<input type="text"/>
f. Other	<input type="checkbox"/> percentage?	<input type="text"/>
Comments:		

## B Objectives

### 1. The main objective of this course

This course is intended to provide a graduate-level introduction to computer vision. Topics include edge detection, image segmentation, image filtering, stereopsis, motion and optical flow, image mosaics, 3D shape reconstruction, object detection and tracking, and deep learning. Students are required to implement several of the algorithms covered in the course and complete a final project.

### 2. Describe briefly any plans for developing and improving the course that are being implemented.

- Students may involve to read current research papers related to topics, bring new ideas, and implement them.

## C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

### Course Description:

This course is intended to provide a graduate-level introduction to computer vision. Topics include edge detection, image segmentation, image filtering, stereopsis, motion and optical flow, image mosaics, 3D shape reconstruction, object detection and tracking, and deep learning.

### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Introduction to Computer Vision	1	3
Cameras and Optics	2	3
Image Filtering	3	3
Interest Points and Corners	4	3
Local Image Features	5	3
Hough Transform	6	3
Clustering and Segmentation	7	3
Stereo Intro and Camera Calibration	8	3
Stereo Correspondence and Optical Flow	9	3
Machine Learning and Pattern Recognition	10	3
Object Detection and Tracking	11	3
Big Data	12	3
Crowd Sourcing and Human Computation	13	3
Deep Learning	14-15	6

### 2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45	----	----	----	----	45
	Actual	45	----	----	----	----	45
Credit	Planned	45	----	----	----	----	45
	Actual	45	----	----	----	----	45



**3. Individual study/learning hours expected for students per week.**

6 hours

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

**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 targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

**Curriculum Map**

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Knowledge of principles and concepts for specific core subject areas.	<ul style="list-style-type: none"> <li>Lectures.</li> <li>Conduct scientific research and the follow-up of all new topics.</li> <li>Class discussions.</li> </ul>	<ul style="list-style-type: none"> <li>Assignment</li> <li>Research</li> <li>Project</li> </ul>
1.2	Match the principles and the concepts to analyze problems within specific core areas		
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Discuss how to overcome educational problems.	<ul style="list-style-type: none"> <li>Solving problems.</li> <li>Homework.</li> <li>Dialogues and discussions.</li> <li>Lectures</li> <li>Looking in the internet.</li> <li>Using computers and software's to understand and analyze data and using simulation programs.</li> <li>Experimental work and its outcomes.</li> </ul>	Discussion and Exam
2.2	Gains the skills of solving scientific problems related to industrial development plans and 2030 Saudi vision in the kingdom.		
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Work effectively in groups and exercise leadership when appropriate.	<ul style="list-style-type: none"> <li>Awareness of time management in completing their projects and reports.</li> <li>Encourage students to help each other</li> <li>Ensure teamwork in projects</li> <li>Whole group discussion.</li> </ul>	<ul style="list-style-type: none"> <li>Respecting deadlines.</li> <li>Helping each other in doing their experiments.</li> <li>Giving clear and logical arguments</li> </ul>
3.2	Familiarity with current developments in Computer Vision.		
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Communicate effectively in oral and written form.	<ul style="list-style-type: none"> <li>E-Learning.</li> <li>PowerPoint Slides.</li> <li>PDF Files.</li> </ul>	<ul style="list-style-type: none"> <li>Written final exam.</li> <li>E – learning programming assignments</li> </ul>
4.2	Gain the skills to use the internet tools for communications.		
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		

<b>5. Assessment Task Schedule for Students During the Semester</b>			
	<b>Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)</b>	<b>Week Due</b>	<b>Proportion of Total Assessment</b>
1	Programming Assignment 1	3	5 points
2	Programming Assignment 2	6	5 points
3	Programming Assignment 3	9	5 points
4	Programming Assignment 4	12	5 points
5	Project Presentation and Report	15	40 points
6	Final Exam	16	40 points

#### **D. Student Academic Counseling and Support**

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)  
Students can meet teaching faculty during office hours as appointed in course syllabus and door schedule.

#### **E Learning Resources**

1. List Required Textbooks  
Computer Vision: Algorithms and Applications by Richard Szeliski, Springer, 2010.

2. List Essential References Materials (Journals, Reports, etc.)  
Related research papers

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.  
None

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.  
None

#### **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.)  
Maximum number of 40 students

2. Technology resources (AV, data show, Smart Board, software, etc.)  
White board and data show

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)  
None

#### **G Course Evaluation and Improvement Procedures**

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching  
Electronic survey by the end of the course

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department  
None

3. Procedures for Teaching Development

Involve students to read research papers and implement novel ideas in the course projects.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)  
Follow up students achievement and progress by marking it on the students sheet.

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.  
We plan to review course effectiveness and development every year and benchmark it in the same course contents and syllabus with high ranked international universities.

Name of Course Instructor: Dr. Tarik Alafif

Signature: \_Dr. Tarik Alafif

Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

Signature: \_\_\_\_\_

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

## COURSE SPECIFICATIONS

### Form

Course Title: **Network Engineering**

Course Code: 23166208-3

<b>Date:</b> 20 18-11-18.	<b>Institution:</b> Umm Al-Qura University
<b>College:</b> Al-Jamoum Colleg	<b>Department:</b> Computer Science

#### A. Course Identification and General Information

1. Course title and code: Network Engineering (23166208-3)			
2. Credit hours: 3 Credits			
3. Program(s) in which the course is offered. Master degree in Advanced Computer Science (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course			
5. Level/year at which this course is offered:			
6. Pre-requisites for this course (if any): Networks 1 (23166203)			
7. Co-requisites for this course (if any):			
8. Location if not on main campus: main campus			
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom	<input checked="" type="checkbox"/>	percentage?	<input type="text" value="100%"/>
b. Blended (traditional and online)	<input type="checkbox"/>	percentage?	<input type="text"/>
c. E-learning	<input type="checkbox"/>	percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/>	percentage?	<input type="text"/>
f. Other	<input type="checkbox"/>	percentage?	<input type="text"/>
Comments:			

#### B Objectives

1. The main objective of this course is to introduce students to advanced technologies which can help realization of complex Web applications and network simulation. Upon completing this course, the students will be able to individually develop advanced Web projects and understand the fundamental concepts of network simulation. The focus is on advanced Java programming applications where techniques (Applet, JSP, Servlet, XML, and Web services) can be used in combination with basic Java classes and also to get in touch with the network simulation framework OMNeT++.
2. Describe briefly any plans for developing and improving the course that are being implemented. <ul style="list-style-type: none"> <li>• Increase learning quality and opportunities by using the e-learning recourses of the UQU portal.</li> <li>• Implementing the course evaluation process to update and improve the course materials.</li> </ul>

## C. Course Description

### Course Description:

The core of the course is program framework Java 2 Enterprise Edition (J2EE), used in construction of multi-layer, Web directed and complex applications. The course provides introduction to basic architecture underpinning J2EE, and deals with all the components of Java technologies contained in J2EE. In addition, after getting a basic introduction to simulation and modeling, we will study a small example project already using OMNeT++. Finally, we will work in small groups of 2-3 people on interesting research-focused projects of the areas vehicular communication and wireless sensor networks.

### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
<b>Advanced Web Technologies</b>	1	5
Introduction into Java programming language	1	5
Advanced elements of Java programming language	1	5
Programming network resources	1	5
Digital signature and certificate	1	5
J2EE elements for data access	1	5
J2EE elements for servlet's side	1	5
J2EE basic services, Distributed processing	1	5
Web services , J2EE complex component model	1	5
<b>Network Simulation</b>	1	5
OMNeT++	1	5
Model Management with git	1	5
Verification and Validation	1	5
Design of Experiments	1	5
Result Evaluation with R	1	5

### 2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	20		50			70
	Actual	20		50			70
Credit	Planned	20		25			45
	Actual	20		25			45

### 3. Individual study/learning hours expected for students per week.

5

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

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

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	develop an understanding of network technologies and applications	Lectures Presentations	Projects assignments Class Activities Quizzes
1.2	be able to conceptualise and explain the functionality of the different layers within a network architecture		
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	be able to explain the architecture and operation of the Internet	Lectures Presentations Brainstorming	Projects assignments Class Activities Quizzes Observation
2.2	be able to use correct terminology within the domain of computer networks		
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Be able to undertake problem identification, formulation and solution	Small group discussion Whole group discussion Brainstorming Presentation	Projects assignments Class Activities Quizzes
3.2	Have a capacity for independent critical thought, rational inquiry and self-directed learning		
3.3	Have a profound respect for truth and intellectual integrity, and for the ethics of scholarship.		
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	work cooperatively in a small group environment.	Projects assignments Class Activities Quizzes	Projects assignments Class Activities Quizzes
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Project A	6	20%
2	Project B	12	20%
3	Presentation, class activities, and group discussion	Every week	10%
4	Homework assignments	After each chapter	10%
5	Quizzes (best 2)	After each chapter	10%
6	Final written exam	16	30%
7	total		100%

#### D. Student Academic Counseling and Support

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

## E Learning Resources

- |   |
|---|
| 1. List Required Textbooks <ul style="list-style-type: none"> <li>Patrick Niemeyer; Daniel Leuck , “Learning Java”, O'Reilly Media, Incorporated, 4<sup>th</sup> edition, 2013.</li> <li>Joseph Adler, “R in a Nutshell”, ed. 2, O'Reilly, 2012.</li> </ul> |
| 2. List Essential References Materials (Journals, Reports, etc.)  |
| 3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.  |
| 4. 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.) <ul style="list-style-type: none"> <li>Classroom, as those that are available at Al-Jamoum Colloge</li> </ul> |
| 2. Technology resources (AV, data show, Smart Board, software, etc.) <ul style="list-style-type: none"> <li>Blackboard</li> </ul>   |
| 3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)   |

## G Course Evaluation and Improvement Procedures

- |   |
|---|
| 1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching <ul style="list-style-type: none"> <li>Questionnaires (course evaluation) achieved by the students</li> <li>Student-faculty management meetings.</li> </ul>   |
| 2. Other Strategies for Evaluation of Teaching by the Instructor or the Department <ul style="list-style-type: none"> <li>Discussion within the staff members teaching the course</li> <li>Departmental internal review of the course.</li> </ul>   |
| 3. Procedures for Teaching Development <ul style="list-style-type: none"> <li>Periodical departmental revision of methods of teaching.</li> <li>Monitoring of teaching activates by senior faculty members.</li> <li>Training course.</li> </ul>  |
| 4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) <ul style="list-style-type: none"> <li>Reviewing the final exam questions and a sample of the answers of the students by others.</li> <li>Visiting the other institutions that introduce the same course one time per semester.</li> </ul> |
| 4. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. <ul style="list-style-type: none"> <li>Course evaluation</li> <li>Exam evaluation</li> <li>Improvement plan</li> </ul>  |

Name of Course Instructor: Dr. Kheir Eddine Bouazza

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

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



## COURSE SPECIFICATIONS

### Form

Course Title: Selected topics

Course Code: 23166306-3

<b>Date:</b> 2018-11-xx	<b>Institution:</b> Umm Al-Qura University
<b>College:</b> Jamoum University College	<b>Department:</b> Computers Department

#### A. Course Identification and General Information

1. Course title and code: Selected topics (23166306-3)		
2. Credit hours: 3		
3. Program(s) in which the course is offered: Master Program in Advanced Computer Science		
4. Name of faculty member responsible for the course: Assigned by the Curriculum Committee		
5. Level/year at which this course is offered: 2 <sup>nd</sup> level/1 <sup>st</sup> year		
6. Pre-requisites for this course (if any): None		
7. Co-requisites for this course (if any): None		
8. Location if not on main campus: Jamoum-Branch		
9. Mode of Instruction (mark all that apply):		
a. Traditional classroom	<input checked="" type="checkbox"/> percentage?	<input type="text" value="100"/>
b. Blended (traditional and online)	<input type="checkbox"/> percentage?	<input type="text"/>
c. E-learning	<input type="checkbox"/> percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/> percentage?	<input type="text"/>
f. Other	<input type="checkbox"/> percentage?	<input type="text"/>
Comments:		

#### B Objectives

1. The main objective of this course <ul style="list-style-type: none"> <li>This course has significant and advanced topics in computer science either because it focuses on a significant applications or use of computers</li> <li>This course focuses on the state-of-the-art of computer topics</li> </ul>
2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field) <ul style="list-style-type: none"> <li>Increase learning opportunities by using the e-learning recourses of the UQU portal.</li> <li>Implementing the course evaluation process to update the course materials.</li> </ul>



**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:** These course topics are chosen by the master degree committee and the research advisors according to the minor of each student to cover advances in one of computer science subjects. **These topics may include, and are not limited to, recent advances in IT such as IoT, Wireless Security, Health Information Systems, Intelligent Systems, Big Data Analytics and Entrepreneurship in IT.**

**1. Topics to be Covered**

List of Topics	No. of Weeks	Contact hours
The topics is decided by the advisor	15	45

**2. Course components (total contact and credit hours per semester):**

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45	-	-	-	-	45
	Actual	45	-	-	-	-	45
Credit	Planned	45	-	-	-	-	45
	Actual	45	-	-	-	-	45

**3. Individual study/learning hours expected for students per week.**

6

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

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

**Curriculum Map**

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Frame problems using multiple representations of relevant the course topics	Lectures Presentations	assignments Class Activities
1.2	Provide a foundation and motivation for exposure to algorithms related to the course topics	Whole group discussion Brainstorming Presentation	assignments Class Activities
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Solve different the course topics problems using standard techniques	Lectures Presentations Brainstorming	assignments Class Activities Observation
2.2	Create quantitative models to solve real world problems in appropriate contexts		
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Clearly communicate quantitative ideas both orally and in writing to a range of audiences	Small group discussion Brainstorming Presentation	assignments Class Activities

<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Effectively use professional level technology tools to support the study of intelligent systems	assignments Class Activities	assignments Class Activities
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		

<b>5. Assessment Task Schedule for Students During the Semester</b>			
	<b>Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)</b>	<b>Week Due</b>	<b>Proportion of Total Assessment</b>
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Assignments	All semester	20
4	Final Exam	17-18	40

## D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)
  - 2-4 office hours per weeks.
  - E-mail communication.

## E Learning Resources

1. List Required Textbooks
  - Are chosen according to the course topics
2. List Essential References Materials (Journals, Reports, etc.)
  - Saudi Digital Library
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
  - UQU e-learning portal.
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.
  - Related Software Packages.

## 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.)
    - Classroom with 35 seats for students.
    - An open computer laboratory for assignments.
  2. Technology resources (AV, data show, Smart Board, software, etc.)
    - Projectors and white boards.
  3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)
    - None

## G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching <ul style="list-style-type: none"><li>• Course evaluation surveys.</li></ul>
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department <ul style="list-style-type: none"><li>• None</li></ul>
3. Procedures for Teaching Development <ul style="list-style-type: none"><li>• Course action plans.</li></ul>
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) <ul style="list-style-type: none"><li>• Student outcomes assessment.</li></ul>
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. <ul style="list-style-type: none"><li>• The student outcomes assessment process is carried every other year.</li></ul>

Name of Course Instructor: Assigned by the Curriculum Committee

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

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

## COURSE SPECIFICATIONS

### Form

Course Title: **Cyber Security.**

Course Code: ...23166307-3..

<b>Date:</b> 5/3/2019	<b>Institution:</b> Umm Al-Qura University
<b>College:</b> Al-Jamoum Colleg	<b>Department:</b> Computer Science

#### A. Course Identification and General Information

1. Course title and code: <b>Cyber Security</b> (23166307-3)		
2. Credit hours: 3 Credits		
3. Program(s) in which the course is offered. Master degree in Advanced Computer Science (If general elective available in many programs indicate this rather than list programs)		
4. Name of faculty member responsible for the course		
5. Level/year at which this course is offered:		
6. Pre-requisites for this course (if any): Networks 1 (23166203-3)		
7. Co-requisites for this course (if any):		
8. Location if not on main campus: main campus		
9. Mode of Instruction (mark all that apply):		
a. Traditional classroom	<input checked="" type="checkbox"/> percentage?	<input type="text" value="100%"/>
b. Blended (traditional and online)	<input type="checkbox"/> percentage?	<input type="text"/>
c. E-learning	<input type="checkbox"/> percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/> percentage?	<input type="text"/>
f. Other	<input type="checkbox"/> percentage?	<input type="text"/>
Comments:		

#### B Objectives

1. Topics of study include security architectures, network defense, data protection and risk management. In addition, the course incorporate robust overviews of peripheral issues such as industrial espionage and digital forensics. After completing the course, student can design and implement security systems that meet the requirements of businesses. They are able to analyze existing systems and test for security flaws. They streamline the security procedures to conform to business processes and find ways to limit conflicts between the productive functions and data protection methods.
2. Describe briefly any plans for developing and improving the course that are being implemented. <ul style="list-style-type: none"> <li>• Increase learning quality and opportunities by using the e-learning recourses of the UQU portal.</li> <li>• Implementing the course evaluation process to update and improve the course materials.</li> </ul>

### C. Course Description

Course Description:		
1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
Difference between Information Security & Cybersecurity	1	3
Cybersecurity roles	1	3
Cybersecurity domains	1	3
Risks	1	3
Common attack types & vectors	2	6
Cybersecurity controls	1	3
Overview of security architecture	1	3
Defense in Depth	2	6
Firewalls	1	3
Cryptography Fundamentals	2	6
Encryption techniques	1	3
Process controls – vulnerability management	1	3

2. Course components (total contact and credit hours per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	30		30			60
	Actual	30		30			60
Credit	Planned	30		15			45
	Actual	30		15			45

3. Individual study/learning hours expected for students per week.	5
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#### 4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

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

##### Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge</b>		
1.1	develop an understanding of network technologies and applications	Lectures Presentations	Written Exam Projects assignments Class Activities Quizzes
1.2	be able to conceptualise and explain the functionality of the different layers within a network architecture		

<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	be able to explain the architecture and operation of the Internet	Lectures Presentations Brainstorming	Written Exam Projects, Quizzes, assignments Class Activities
2.2	be able to use correct terminology within the domain of computer networks		
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Be able to undertake problem identification, formulation and solution	Small group discussion Whole group discussion Brainstorming Presentation	Written Exam Projects assignments Class Activities Quizzes
3.2	Have a capacity for independent critical thought, rational inquiry and self-directed learning		
3.3	Have a profound respect for truth and intellectual integrity, and for the ethics of scholarship.		
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	work cooperatively in a small group environment.	Written Exam, Projects Assignments, Class Activities , Quizzes	Written Exam, Projects, assignments Class Activities, Quizzes
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		
<b>5. Assessment Task Schedule for Students During the Semester</b>			
	<b>Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)</b>	<b>Week Due</b>	<b>Proportion of Total Assessment</b>
1	Project A	7	15%
2	Project B	12	15%
3	Presentation, class activities, and group discussion	Every week	10%
4	Homework assignments	After each chapter	10%
5	Quizzes (best 2)	After each chapter	10%
6	Final written exam	16	40%
7	total		100%

#### D. Student Academic Counseling and Support

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

#### E Learning Resources

- List Required Textbooks  
Cybersecurity Essentials by Charles J. Brooks, Christopher Grow, Philip Craig, Donald Short, 2018.
- List Essential References Materials (Journals, Reports, etc.)
- List Electronic Materials, Web Sites, Facebook, Twitter, etc.
- 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.) <ul style="list-style-type: none"> <li>• Classroom, as those that are available at Al-Jamoum College</li> </ul>
2. Technology resources (AV, data show, Smart Board, software, etc.) <ul style="list-style-type: none"> <li>• Blackboard</li> </ul>
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

#### G Course Evaluation and Improvement Procedures

5. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching <ul style="list-style-type: none"> <li>• Questionnaires (course evaluation) achieved by the students</li> <li>• Student-faculty management meetings.</li> </ul>
6. Other Strategies for Evaluation of Teaching by the Instructor or the Department <ul style="list-style-type: none"> <li>• Discussion within the staff members teaching the course</li> <li>• Departmental internal review of the course.</li> </ul>
7. Procedures for Teaching Development <ul style="list-style-type: none"> <li>• Periodical departmental revision of methods of teaching.</li> <li>• Monitoring of teaching activates by senior faculty members.</li> <li>• Training course.</li> </ul>
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) <ul style="list-style-type: none"> <li>• Reviewing the final exam questions and a sample of the answers of the students by others.</li> <li>• Visiting the other institutions that introduce the same course one time per semester.</li> </ul>
8. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. <ul style="list-style-type: none"> <li>• Course evaluation</li> <li>• Exam evaluation</li> <li>• Improvement plan</li> </ul>

Name of Course Instructor: \_\_\_ Dr. Alaa E. Abdel-Hakim M. Aly

Signature: \_\_\_\_\_ Date Completed 6/3/2019

Program Coordinator: Dr. Kheir Eddine Bouazza

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

## COURSE SPECIFICATIONS

### Form

Course Title: .. **Bioinformatics**

Course Code:.. 23166308-3

<b>Date:</b> 5/3/2019	<b>Institution:</b> Umm Al-Qura University
<b>College:</b> Al-Jamoum Colleg	<b>Department:</b> Computer Science

#### A. Course Identification and General Information

1. Course title and code: Bioinformatics (23166308-3)		
2. Credit hours: 3 Credits		
3. Program(s) in which the course is offered. Master degree in Advanced Computer Science (If general elective available in many programs indicate this rather than list programs)		
4. Name of faculty member responsible for the course		
5. Level/year at which this course is offered:		
6. Pre-requisites for this course (if any):		
7. Co-requisites for this course (if any):		
8. Location if not on main campus: main campus		
9. Mode of Instruction (mark all that apply):		
a. Traditional classroom	<input checked="" type="checkbox"/> percentage?	<input type="text" value="100%"/>
b. Blended (traditional and online)	<input type="checkbox"/> percentage?	<input type="text"/>
c. E-learning	<input type="checkbox"/> percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/> percentage?	<input type="text"/>
f. Other	<input type="checkbox"/> percentage?	<input type="text"/>
Comments:		

#### B Objectives

1. The course basic objective is to give students an introduction to the basic practical techniques of bioinformatics. Emphasis will be given to the application of bioinformatics and biological databases to problem solving in real research problems. The course will also provide practical training in bioinformatics methods including accessing the major public sequence databases, use of the different computational tools to find sequences, analysis of protein and nucleic acid sequences by various software packages. It also provides a step by step, theoretical and practical introduction to the development of useful tools for automation of complex computer jobs, and making these tools accessible on the network from a Web browser.
2. Describe briefly any plans for developing and improving the course that are being implemented.



- Increase learning quality and opportunities by using the e-learning resources of the UQU portal.
- Implementing the course evaluation process to update and improve the course materials.

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:**

**1. Topics to be Covered**

List of Topics	No. of Weeks	Contact hours
Basics for Bioinformatics	1	3
Basic Statistics for Bioinformatics	1	3
Topics in Computational Genomics	2	6
Statistical Methods in Bioinformatics	1	3
Algorithms in Computational Biology	2	6
Multivariate Statistical Methods in Bioinformatics Research .	2	6
Association Analysis for Human Diseases: Methods and Examples .	2	6
Data Mining and Knowledge Discovery Methods with Case Examples	2	6
Applied Bioinformatics Tools.	2	6

**2. Course components (total contact and credit hours per semester):**

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	45					45
	Actual	45					45

**3. Individual study/learning hours expected for students per week.**

5

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

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

**Curriculum Map**

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	develop an understanding of network technologies and applications	Lectures Presentations	Written Exam assignments Class Activities Quizzes
1.2	be able to conceptualise and explain the functionality of the different layers within a network architecture		

<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	be able to explain the architecture and operation of the Internet	Lectures Presentations Brainstorming	Written Exam Quizzes, assignments Class Activities
2.2	be able to use correct terminology within the domain of computer networks		
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Be able to undertake problem identification, formulation and solution	Small group discussion Whole group discussion Brainstorming Presentation	Written Exam assignments Class Activities Quizzes
3.2	Have a capacity for independent critical thought, rational inquiry and self-directed learning		
3.3	Have a profound respect for truth and intellectual integrity, and for the ethics of scholarship.		
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	work cooperatively in a small group environment.	Written Exam, Assignments, Class Activities , Quizzes	Written Exam, assignments Class Activities, Quizzes
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Written exam 1	7	15%
2	Written exam 2	12	15%
3	Presentation, class activities, and group discussion	Every week	10%
4	Homework assignments	After each chapter	10%
5	Quizzes (best 2)	After each chapter	10%
6	Final written exam	16	40%
7	total		100%

#### D. Student Academic Counseling and Support

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

#### E Learning Resources

- List Required Textbooks  
Bioinformatics Algorithms: An Active Learning Approach, by Phillip Compeau, Active Learning Publishers; 3rd edition, 2018.
- List Essential References Materials (Journals, Reports, etc.)
- List Electronic Materials, Web Sites, Facebook, Twitter, etc.
- 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.) <ul style="list-style-type: none"> <li>Classroom, as those that are available at Al-Jamoum College</li> </ul>
2. Technology resources (AV, data show, Smart Board, software, etc.) <ul style="list-style-type: none"> <li>Blackboard</li> </ul>
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

#### G Course Evaluation and Improvement Procedures

9. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching <ul style="list-style-type: none"> <li>Questionnaires (course evaluation) achieved by the students</li> <li>Student-faculty management meetings.</li> </ul>
10. Other Strategies for Evaluation of Teaching by the Instructor or the Department <ul style="list-style-type: none"> <li>Discussion within the staff members teaching the course</li> <li>Departmental internal review of the course.</li> </ul>
11. Procedures for Teaching Development <ul style="list-style-type: none"> <li>Periodical departmental revision of methods of teaching.</li> <li>Monitoring of teaching activates by senior faculty members.</li> <li>Training course.</li> </ul>
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) <ul style="list-style-type: none"> <li>Reviewing the final exam questions and a sample of the answers of the students by others.</li> <li>Visiting the other institutions that introduce the same course one time per semester.</li> </ul>
12. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. <ul style="list-style-type: none"> <li>Course evaluation</li> <li>Exam evaluation</li> <li>Improvement plan</li> </ul>

Name of Course Instructor: \_\_ Dr. Abdel-Rahman Hedar

Signature: \_\_\_\_\_ Date Completed: 6/3/2019

Program Coordinator: Dr. Kheir Eddine Bouazza

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

## COURSE SPECIFICATIONS

### Form

Course Title: .. **Distributed Computing Systems**

Course Code:.. 23166309-3

<b>Date:</b> 5/3/2019	<b>Institution:</b> Umm Al-Qura University
<b>College:</b> Al-Jamoum College	<b>Department:</b> Computer Science

#### A. Course Identification and General Information

1. Course title and code: Distributed Computing Systems (23166309-3)		
2. Credit hours: 3 Credits		
3. Program(s) in which the course is offered. Master degree in Advanced Computer Science (If general elective available in many programs indicate this rather than list programs)		
4. Name of faculty member responsible for the course		
5. Level/year at which this course is offered:		
6. Pre-requisites for this course (if any): 23166203-3 & 23166102-3		
7. Co-requisites for this course (if any):		
8. Location if not on main campus: main campus		
9. Mode of Instruction (mark all that apply):		
a. Traditional classroom	<input checked="" type="checkbox"/> percentage?	<input type="text" value="100%"/>
b. Blended (traditional and online)	<input type="checkbox"/> percentage?	<input type="text"/>
c. E-learning	<input type="checkbox"/> percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/> percentage?	<input type="text"/>
f. Other	<input type="checkbox"/> percentage?	<input type="text"/>
Comments:		

#### B Objectives

1. The course basic objective is to provide students foundation with fundamental concepts and mechanisms of distributed computing systems. Most of the issues discussed in this course material are the essence of advanced operating systems and computer networks. The course also describes distributed algorithms for solving various problems of distributed systems. Students will learn how to specify and code communication among the components of a distributed system. In this course we will consider higher-level system issues: distributed transactions, replication, security, management, and caching.

2. Describe briefly any plans for developing and improving the course that are being implemented.

- Increase learning quality and opportunities by using the e-learning recourses of the UQU portal.
- Implementing the course evaluation process to update and improve the course materials.

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

<b>Course Description:</b>		
<b>1. Topics to be Covered</b>		
<b>List of Topics</b>	<b>No. of Weeks</b>	<b>Contact hours</b>
Introduction to distributed computing systems (DCS)	1	3
DCS design goals, Transparencies, Fundamental issues	1	3
Distributed Coordination	2	6
Process synchronization	2	6
Inter-process communication	2	6
Deadlocks in distributed systems	2	6
Load scheduling and balancing techniques	2	6
Distributed database system : A Case study	3	9

<b>2. Course components (total contact and credit hours per semester):</b>							
		<b>Lecture</b>	<b>Tutorial</b>	<b>Laboratory/ Studio</b>	<b>Practical</b>	<b>Other</b>	<b>Total</b>
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	45					45
	Actual	45					45

<b>3. Individual study/learning hours expected for students per week.</b>	5
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<b>4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies</b>			
<b>On the table below are the five NQF Learning Domains, numbered in the left column.</b>			
<b>Curriculum Map</b>			
<b>Code #</b>	<b>NQF Learning Domains And Course Learning Outcomes</b>	<b>Course Teaching Strategies</b>	<b>Course Assessment Methods</b>
<b>1.0</b>	<b>Knowledge</b>		
1.1	develop an understanding of network technologies and applications	Lectures Presentations	Written Exam, Project assignments Class Activities Quizzes
1.2	be able to conceptualise and explain the functionality of the different layers within a network architecture		
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	be able to explain the architecture and operation of the Internet	Lectures Presentations Brainstorming	Written Exam Quizzes, Project assignments Class Activities
2.2	be able to use correct terminology within the domain of computer networks		

<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Be able to undertake problem identification, formulation and solution	Small group discussion Whole group discussion Brainstorming Presentation	Written Exam assignments Project Class Activities Quizzes
3.2	Have a capacity for independent critical thought, rational inquiry and self-directed learning		
3.3	Have a profound respect for truth and intellectual integrity, and for the ethics of scholarship.		
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	work cooperatively in a small group environment.	Written Exam, Project Assignments, Class Activities, Quizzes	Written Exam, Assignments, Project Class Activities, Quizzes
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		
<b>5. Assessment Task Schedule for Students During the Semester</b>			
	<b>Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)</b>	<b>Week Due</b>	<b>Proportion of Total Assessment</b>
1	Written exam 1	7	15%
2	Written exam 2	12	15%
3	Presentation, class activities, and group discussion	Every week	10%
4	Homework assignments	After each chapter	10%
5	Quizzes (best 2)	After each chapter	10%
6	Project	Week 14	10%
7	Final written exam	16	30%
8	total		100%

## D. Student Academic Counseling and Support

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

## E Learning Resources

3. List Required Textbooks

- Introduction to Reliable and Secure Distributed Programming by Christian Cachin, Rachid Guerraoui and Luís Rodrigues, Springer, 2011.

2. List Essential References Materials (Journals, Reports, etc.)

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

4. 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.)

- Classroom, as those that are available at Al-Jamoum College

2. Technology resources (AV, data show, Smart Board, software, etc.) <ul style="list-style-type: none"><li>• Blackboard</li></ul>
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

#### G Course Evaluation and Improvement Procedures

13. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching <ul style="list-style-type: none"><li>• Questionnaires (course evaluation) achieved by the students</li><li>• Student-faculty management meetings.</li></ul>
14. Other Strategies for Evaluation of Teaching by the Instructor or the Department <ul style="list-style-type: none"><li>• Discussion within the staff members teaching the course</li><li>• Departmental internal review of the course.</li></ul>
15. Procedures for Teaching Development <ul style="list-style-type: none"><li>• Periodical departmental revision of methods of teaching.</li><li>• Monitoring of teaching activates by senior faculty members.</li><li>• Training course.</li></ul>
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) <ul style="list-style-type: none"><li>• Reviewing the final exam questions and a sample of the answers of the students by others.</li><li>• Visiting the other institutions that introduce the same course one time per semester.</li></ul>
16. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. <ul style="list-style-type: none"><li>• Course evaluation</li><li>• Exam evaluation</li><li>• Improvement plan</li></ul>

Name of Course Instructor: Dr. Gamal A. Elsayed

Signature: \_\_\_\_\_ Date Completed: 6/3/2019

Program Coordinator: Dr. Kheir Eddine Bouazza

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

## COURSE SPECIFICATIONS

### Form

Course Title: Seminar

Course Code: 23166104-3

Date: 2018-11-xx	Institution: Umm Al-Qura University
College: Jamoum University College	Department: Computer Science Department

#### A. Course Identification and General Information

1. Course title and code: Seminar (23166104-3)		
2. Credit hours: 1 hr		
3. Program(s) in which the course is offered. Master program in Advanced Computer Science		
4. Name of faculty member responsible for the course		
5. Level/year at which this course is offered:		
6. Pre-requisites for this course (if any):		
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"/> percentage?	<input type="text" value="100"/>
b. Blended (traditional and online)	<input type="checkbox"/> percentage?	<input type="text"/>
c. E-learning	<input type="checkbox"/> percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/> percentage?	<input type="text"/>
f. Other	<input type="checkbox"/> percentage?	<input type="text"/>
Comments:		

#### B Objectives

1. The main objective of this course The main objective is to cover some area of active research in theoretical computer science. Lectures are often based on research or survey papers in that area, and/or on lecture notes from other advanced courses
2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)



**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:**

Research Methods introduces graduate students to basic ideas about conducting a personal research. Students will learn methods for selecting research topics, devising research questions, planning research, analysing experimental results, modelling and simulating computational phenomena, and synthesizing broader theories. The course will be structured around three activities: lectures on research strategy and tactics, statistical methods, and experimental design; discussions of technical papers; and preparation and review of written assignments. Significant reading, reviewing, and writing will be required, and students will be expected to participate actively in class discussions.

**1. Topics to be Covered**

List of Topics	No. of Weeks	Contact hours
The topics is decided by the advisors. The contents of the course may vary from one student to another. Example on topics is approximation algorithms, data mining, cryptography, deep learning and probabilistic algorithms.	15	45

**2. Course components (total contact and credit hours per semester):**

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	45					45
	Actual	45					45

**3. Individual study/learning hours expected for students per week.**

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

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

**Curriculum Map**

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	a student should be able to discuss advanced concepts within the field of the seminars	Lectures Presentations	Presentations assignments Class Activities

1.2	attack problems within a research area through own work and through search of relevant information	Lectures Presentations	Presentations assignments Class Activities
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	be able to explain the exposed research areas	Lectures Presentations	Presentations assignments Class Activities
2.2	be able to use correct terminology within the domain of exposed research areas		
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Be able to undertake problem identification, formulation and solution	Small group discussion Whole group discussion Lectures Presentations	Presentations assignments Class Activities
3.2	Have a capacity for independent critical thought, rational inquiry and self-directed learning		
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Work cooperatively in a small group environment.	Small group discussion Whole group discussion Brainstorming Presentation	Presentations assignments Class Activities
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	An evaluation is given after each student presents his seminar	During the 15 weeks	100%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)
  - 2-4 office hours per weeks.
  - E-mail communication.

#### E Learning Resources

1. List Required Textbooks
  - Decided by the course instructor
2. List Essential References Materials (Journals, Reports, etc.)
  - Saudi Digital Library
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
  - UQU e-learning portal.
4. 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.)

- Classroom with 35 seats for students.

2. Technology resources (AV, data show, Smart Board, software, etc.)

- Projectors and white boards.

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

## G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

- Course evaluation surveys.

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

- None

3. Procedures for Teaching Development

- Course action plans.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

- Student oral presentation

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

- Seminars evaluation
- Improvement plan

Name of Course Instructor: Assigned by the Curriculum Committee

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

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

## COURSE SPECIFICATIONS

### Form

Course Title: **Research Methods**

Course Code: 23166310-3

Date: 2018-11-xx	Institution: Umm Al-Qura University
College: Jamoum University College	Department: Computer Science Department

#### A. Course Identification and General Information

1. Course title and code: <b>Research Methods</b> (23166310-3)		
2. Credit hours: 3 hr		
3. Program(s) in which the course is offered. Master program in Advanced Computer Science		
4. Name of faculty member responsible for the course: Assigned by the Curriculum Committee		
5. Level/year at which this course is offered: 3 <sup>rd</sup> level		
6. Pre-requisites for this course (if any):		
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"/> percentage?	<input type="text" value="100"/>
b. Blended (traditional and online)	<input type="text"/> percentage?	<input type="text"/>
c. E-learning	<input type="text"/> percentage?	<input type="text"/>
d. Correspondence	<input type="text"/> percentage?	<input type="text"/>
f. Other	<input type="text"/> percentage?	<input type="text"/>
Comments:		

#### B Objectives

1. The main objective of this course is to enable students to develop an appropriate methodology for their research studies; and to make them familiar with the art of using different research methods and techniques. It is hoped that this course will help conduct research studies focused on achieving promising results. At the end of this course, students should be able to present their thesis proposal and to formulate its research questions, aims and objectives.
2. Describe briefly any plans for developing and improving the course that are being implemented. <ul style="list-style-type: none"> <li>• Increase learning quality and opportunities by using the e-learning recourses of the UQU portal.</li> <li>• Implementing the course evaluation process to update and improve the course materials.</li> </ul>

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:**

**1. Topics to be Covered**

List of Topics	No. of Weeks	Contact hours
"Culture" and "Psychology" of the research enterprise	1	3
Written communication skills	2	6
Research ethics	1	3
Training in the "research game"	1	3
Proposal writing (& reviewing)	2	6
Paper writing (& reviewing)	2	6
Oral communications	1	3
Thesis Proposal: Writing the Proposal	2	6
Proposal presentation	2	6
Evaluation of the Proposal	1	3

**2. Course components (total contact and credit hours per semester):**

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	45					45
	Actual	45					45
Credit	Planned	45					45
	Actual	45					45

**3. Individual study/learning hours expected for students per week.**

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

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

**Curriculum Map**

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	a student should be able to discuss advanced concepts within the field of the research methods	group project, speech, oral presentation,	Writing exams, quizzes, project, oral presentation
1.2	attack problems within a research area through own work and through search of relevant information	group project, speech, oral presentation,	project, oral presentation

<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	be able to explain the exposed research areas	group project, examination, speech, oral presentation,	project, oral presentation
2.2	be able to use correct terminology within the domain of exposed research areas	group project, examination, speech, oral presentation,	Writing exams, quizzes, project, oral presentation
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Be able to undertake problem identification, formulation and solution	group project, examination, speech, oral presentation,	Writing exams, quizzes, project, oral presentation
3.2	Have a capacity for independent critical thought, rational inquiry and self-directed learning		
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Work cooperatively in a small group environment.		
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Written exam 1	7	15%
2	Written exam 2	12	15%
3	Presentation, class activities, and group discussion	Every week	10%
4	Homework assignments	After each chapter	10%
5	Quizzes (best 2)	After each chapter	10%
6	Proposal Presentation	Week 13	40%
7	total		100%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling.
  - 2-4 office hours per weeks.
  - E-mail communication.

#### E Learning Resources

1. List Required Textbooks
  - Decided by the course instructor
2. List Essential References Materials (Journals, Reports, etc.)
  - Saudi Digital Library
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
  - UQU e-learning portal.

4. 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.)

- Classroom with 35 seats for students.

2. Technology resources (AV, data show, Smart Board, software, etc.)

- Projectors and white boards.

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

## G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

- Course evaluation surveys.

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

- None

3. Procedures for Teaching Development

- Course action plans.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

- Student oral presentation

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

- Seminars evaluation
- Improvement plan

Name of Course Instructor: Dr. Mohammed Ali Alghamdi

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

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

## COURSE SPECIFICATIONS

### Form

Course Title: **Master Thesis**

Course Code: 23166401-3

Date: 2018-11-xx	Institution: Umm Al-Qura University
College: Jamoum University College	Department: Computer Science Department

#### A. Course Identification and General Information

1. Course title and code: Master Thesis (23166401-3)		
2. Credit hours: <b>6 hrs</b>		
3. Program(s) in which the course is offered: Master Program in Advanced Computer Science		
4. Name of faculty member responsible for the course: Assigned by the Curriculum Committee		
5. Level/year at which this course is offered: 4 <sup>th</sup> level		
6. Pre-requisites for this course (if any): None		
7. Co-requisites for this course (if any): None		
8. Location if not on main campus: Jamoum-Branch		
9. Mode of Instruction (mark all that apply):		
a. Traditional classroom	<input checked="" type="checkbox"/> percentage?	<input type="text" value="100"/>
b. Blended (traditional and online)	<input type="text"/> percentage?	<input type="text"/>
c. E-learning	<input type="text"/> percentage?	<input type="text"/>
d. Correspondence	<input type="text"/> percentage?	<input type="text"/>
f. Other	<input type="text"/> percentage?	<input type="text"/>
Comments:		

#### B Objectives

1. The main objective of this course Be able to complete a larger, independent project, including defining a project plan with milestones, reporting partial results and writing a master thesis according to professional and scientific standards
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2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)  
Increase learning opportunities by using the e-learning recourses of the UQU portal.  
Implementing the course evaluation process to update the course materials.

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:**

**1. Topics to be Covered**

List of Topics	No. of Weeks	Contact hours
The Research Proposal must be readable by a wide academic audience and contain the following elements:	15 weeks	135
Description of the proposed research: background/status questions, aims/research questions, methods, scientific and/or social relevance of the research project		
formulation of the research question		
explanation of central concepts and main premises ; clear perspective ; critical distance		
adequate and consistent use of sources, translations and references		

**2. Course components (total contact and credit hours per semester):**

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned						135
	Actual						135
Credit	Planned						135
	Actual						135

**3. Individual study/learning hours expected for students per week.**

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

**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 targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the

rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

#### Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Insight in how research results are generated and reported within the student's master specialty area	oral presentation,	oral presentation
1.2	Awareness of important principles of research ethics / academic honesty.	oral presentation,	oral presentation
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Ability to acquire in-depth knowledge in the chosen topic using scientific working methods	oral presentation,	oral presentation
2.2	Getting knowledge from literature search	oral presentation,	oral presentation
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Clearly communicate quantitative ideas both orally and in writing to a range of audiences	oral presentation,	oral presentation
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Effectively use professional level technology tools to support the study of mathematics and statistics	oral presentation,	oral presentation
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	None		

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Literature survey	4	20%
2	Mid-term report	8	10%
3	Oral Presentation	15	70%
4	total		100%

#### D. Student Academic Counseling and Support

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

#### E Learning Resources

1. List Required Textbooks
2. List Essential References Materials (Journals, Reports, etc.)
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
4. 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.) Demonstration room
2. Technology resources (AV, data show, Smart Board, software, etc.) Data show
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) Project Classroom

## G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
3. Procedures for Teaching Development
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)  A jury is formed, by the department board, to judge the thesis The jury writes a pre-report about the thesis oral presentation The jury writes a detailed report on the thesis with a specific grade.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: Thesis Advisor

Signature: \_\_\_\_\_ Date Completed: 22/11/2018

Program Coordinator: Dr. Kheir Eddine Bouazza

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