National Commission for
Academic Accreditation &
Assessment

Umm Al-Qura University
Jamoum University College
Dept. of Computers

COMPUTER PROGRAMMING SKILLS

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Computer Programming Skills	23161101-3
2. Credit hours:	3	
3. Program(s) in which the course is offered:		Computer Science Information Systems
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)
5. Level/year at which this course is offered		1/1
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 Campus

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

This course introduces computer programming and problem solving in a structured program logic environment using the C and C++ languages. Emphasis is placed upon development of correct, efficient programs that are easy to maintain. Topics include language syntax, data types, problem analysis, program design, debugging, code comments, problem-solving methods, and logic control structures. Basic features of the C and C++ programming language such as data types, control structures, input/output statements, functions, and arrays are covered.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
1. Introduction Computer Programming	1	4
2. Input and output statements	1	4
3. Data Types	2	8
4. Operator precedence	1	4
5. Decision Structures and Boolean Logic	3	12
6. Loops and Repetition Structures	3	12
7. Functions	2	8
8. Arrays	2	8

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
30	0	30	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

1.   Understand the basic terminology used in computer programming.
2.   Explain the concept of data storage and named memory locations.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Tutorials, Practical sessions, Discussion.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments, Practical exams.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

1. Write and incorporate functions to demonstrate program competence.
2. Write, compile and debug programs in C language.

(ii) Teaching strategies to be used to develop these cognitive skills

- Lectures, Tutorials, Practical sessions, Discussion.

(iii) Methods of assessment of student's cognitive skills

- Written exams, Assignments, Practical exams.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

- None.

(ii) Teaching strategies to be used to develop these skills and abilities

- None.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- None.

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d.	Communication, Information Technology and Numerical Skills
(i)	Description of the skills to be developed in this domain.

1. Use different data types as variables and arrays in a computer program and apply decision and repetition structures in program design.

(ii)	Teaching strategies to be used to develop these skills

- Lectures, Tutorials, Practical sessions, Discussion.

(iii)	Methods of assessment of students numerical and communication skills

- Written exams, Assignments, Practical exams.

e.	Psychomotor Skills (if applicable)
(i)	Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii)	Teaching strategies to be used to develop these skills

- None.

(iii)	Methods of assessment of student's psychomotor skills

- None.

5. Schedule of Assessment Tasks for Students During the Semester			
No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Practical Exams	16	20
4	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)

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- Tony Gaddis. Starting Out with C++ from Control Structures   through Objects, Brief Version. Pearson, 2015.

2. Essential References
- H.M. Deitel, P.J. Deitel, C++ How to Program, 9th Edition, Prentice Hall, 2012.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- Software: C++ software, Basic applications.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.
- General computer laboratories (max 20 students per session).

2. Computing resources
- Software: C++ software, Basic applications.
- Internet Access.

3. Other resources
- None.

G.   Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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COMPUTER PROGRAMMING

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Computer Programming		23162102-4
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science Information Systems	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		3/2	
6. Pre-requisites for this course (if any)		Computer Programming Skills (23161101-3)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

This course examines advanced features of modern programming languages such as pointers, files, modules. Upon the completion of this course, the student will have learned, through appropriate classroom and laboratory experiences, the essential of the concepts of the structured programming paradigm. They should identify the steps involved in creating a structured program and understand the nature and function, arrays, pointers and main file processing. They should also use these structures within a high-level language constructs and syntax (C++) to design, write and debug appropriate computer programs.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Functions	3	12
Recursion	1	4
Global Variables and Global Constants	1	4
Arrays and Vectors	3	12
Pointers	3	12
Files processing	2	8
Modules	2	8

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2. Course components (total contact hours per semester):				
Lecture	**Tutorial**	**Laboratory**	**Practical/Field work/Internship**	**Other: None**
30	**0**	**30**	**0**	**0**

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

   1.   Understand the advanced terminology and concepts of structured programming technique.
   2.   Demonstrate basic knowledge and understanding of functions, arrays and file streams.

(ii) Teaching strategies to be used to develop that knowledge

   • Lectures, Tutorials, Practical sessions, Discussion.

(iii) Methods of assessment of knowledge acquired

   • Written exams, Assignments, Practical exams.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

(ii) Teaching strategies to be used to develop these cognitive skills

   • None.

(iii) Methods of assessment of student's cognitive skills

   • None.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

   1.   Design, write and debug computer programs in C++ language within the structured programming paradigm.

(ii) Teaching strategies to be used to develop these skills and abilities

   • Lectures, Tutorials, Practical sessions, Discussion.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

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• Written exams, Assignments, Practical exams.	

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

    1. Interpret verbal problem specifications and algorithms into program code using C++ language.

(ii) Teaching strategies to be used to develop these skills

• Lectures, Tutorials, Practical sessions, Discussion.

(iii) Methods of assessment of students numerical and communication skills

• Written exams, Assignments, Practical exams.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

• None.

(ii) Teaching strategies to be used to develop these skills

• None.

(iii) Methods of assessment of student's psychomotor skills

• None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Practical Exams	16	20
4	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)

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- Tony Gaddis. Starting Out with C++ from Control Structures through Objects, Brief Version. Pearson, 2015.

2. Essential References
- H.M. Deitel, P.J. Deitel, C++ How to Program, 9th Edition, Prentice Hall, 2012.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- Software: C++ software, Basic applications.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.
- General computer laboratories (max 20 students per session).

2. Computing resources
- Software: C++ software, Basic applications.
- Internet Access.
- Specialized computer laboratories (max 16 students per session).
  - Free Lab

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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DISCRETE STRUCTURES I
NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Discrete Structures I	23162103-3
2. Credit hours:	3	
3. Program(s) in which the course is offered:	Computer Science Information Systems	
4. Name of faculty member responsible for the course:	The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered	3/2	
6. Pre-requisites for this course (if any)	Calculus II (2304102-4)	
7. Co-requisites for this course (if any)	None	
8. Location if not on main campus	Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

Upon completing this course the student will have learned, through appropriate classroom and laboratory experiences, the fundamental mathematical methods for characterizing and analyzing discrete systems. In addition, he/she should understand the modern algebraic concepts, logic theory, set theory, algorithms, and the graph theory.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
1. The Mathematical Logic	3	9
2. Sequences, Induction and Recursion	3	9
3. Sets, Functions and Relations	3	9
4. Counting and Probabilities	2	6
5. Graphs and Trees	2	6
6. Analysis of Algorithms	2	6

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None

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45	0	0	0	0

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

    3-4 hours/week.

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

    1. Demonstrate basic knowledge and understanding of a core of analysis, algebra and applied mathematics.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Tutorials, Discussion.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

    1. Identify appropriate methods of problem modelling and solving.
    2. Identify a range of solutions and critically evaluate and justify proposed design solutions.
    3. Solve computer science related problems using sets, sequences, probabilities, logic and graphs.

(ii) Teaching strategies to be used to develop these cognitive skills

- Lectures, Tutorials, Discussion.

(iii) Methods of assessment of student's cognitive skills

- Written exams, Assignments.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

    1. Gain the skills of creative thinking.

(ii) Teaching strategies to be used to develop these skills and abilities

- Lectures, Tutorials, Discussion.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- Written exams, Assignments.

d. Communication, Information Technology and Numerical Skills

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(i) Description of the skills to be developed in this domain	
• None.	
(ii) Teaching strategies to be used to develop these skills	
• None.	
(iii) Methods of assessment of students numerical and communication skills	
• None.	

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required
• None.
(ii) Teaching strategies to be used to develop these skills
• None.
(iii) Methods of assessment of student's psychomotor skills
• None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Assignments	1-15	20
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- Susanna S. Epp, Introduction to Discrete Structures with Applications, Cengage Learning, 4th Edition, 2010.

2. Essential References

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- Walter Denis Wallis. A beginner's guide to discrete mathematics. Springer Science & Business Media, 2011.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- None.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- None.

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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OBJECT-ORIENTED PROGRAMMING

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Object-Oriented Programming		23162104-4
2. Credit hours:	4		
3. Program(s) in which the course is offered:		Computer Science Information Systems	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		4/2	
6. Pre-requisites for this course (if any)		Computer Programming (23162102-4)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

This course is to study the fundamental concepts and techniques necessary to write high-quality programs, including basic concepts of Object-Oriented programming, exception handling, and class libraries. Students will learn how to use inheritance, interfaces, exception handling, and how to incorporate graphical user interfaces (GUIs) into their programming applications. Students will also learn how to apply object-oriented design and programming principles to their programs. Typical assignments and projects include using built-in and programmer-defined classes to develop full-featured, easy-to-use programs. All of the mentioned concepts and techniques are studied using the Java language. It is important to note that this course is not a Java training course. The emphasis is on the concepts and techniques rather than the language itself.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Introduction to Object-Oriented concepts and design	1	5
Overview of Java programming	1	5
Data Types in Java	1	5
Classes and Objects	2	10
Exceptions and Input/Output	1	5

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Extending Classes	1	5
Inheritance	2	10
Encapsulation	1	5
Graphical User Interface (GUI)	3	15
Events	2	10

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	30	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

   1. Demonstrate an introductory understanding of graphical user interfaces, multi-threaded programming, and event-driven programming.
   2. Write self-documenting code with an appropriate user interface that meets the style requirements for readability and usability.

(ii) Teaching strategies to be used to develop that knowledge

   • Lectures, Tutorials, Practical sessions, Projects, Discussion.

(iii) Methods of assessment of knowledge acquired

   • Written exams, Assignments, Practical exams, Reports, and Project Discussion.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

   1. Implement and design object-oriented programs that use advanced features and concepts such as encapsulation and inheritance.

(ii) Teaching strategies to be used to develop these cognitive skills

   • Lectures, Tutorials, Practical sessions, Projects, Discussion.

(iii) Methods of assessment of student's cognitive skills

   • Written exams, Assignments, Practical exams, Reports, and Project Discussion.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

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(ii) Teaching strategies to be used to develop these skills and abilities

- None.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- None.

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

1. Demonstrate basic knowledge of software engineering concepts.

(ii) Teaching strategies to be used to develop these skills

- Lectures, Tutorials, Practical sessions, Projects, Discussion.

(iii) Methods of assessment of students numerical and communication skills

- Written exams, Assignments, Practical exams, Reports, and Project Discussion.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	15
2	Midterm Exam 2	12-13	15
3	Practical Exams	16	20
4	Projects	16	10
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

- 2-4 office hours per weeks.

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- E-mail communication.

E. Learning Resources

1. Required Text(s)
- Tony Gaddis, Starting Out with Java: From Control Structures through Objects, 6th Edition, 2015.

2. Essential References
- Harvey M. Deitel, Paul, J. Deitel, Java How to Program, 9th Edition, Prentice Hall, 2012.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- Software: Java software, Basic applications.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.
- General computer laboratories (max 20 students per session).

2. Computing resources
- Software: Java software, Basic applications.
- Internet Access.
- Specialized computer laboratories (max 16 students per session).
  - Free Lab

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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

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DISCRETE STRUCTURES II
NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Discrete Structures II		23162105-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science Information Systems	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		4/2	
6. Pre-requisites for this course (if any)		Discrete Structures I (23162103-3) Computer Programming (23162102-4)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
Upon completing this course the student will have learned, through appropriate classroom experiences, the advanced topics in graph theory, number theory and random algorithms, and their applications in computing.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Graph Theory	4	12
Graph Algorithms	3	9
Arithmetic Algorithms	3	9
Cryptography	3	9
Random Walks	2	6

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge
(i) Description of the knowledge to be acquired   2. Demonstrate basic knowledge and understanding of a core of analysis, algebra and applied mathematics.
(ii) Teaching strategies to be used to develop that knowledge   • Lectures, Tutorials, Discussion.
(iii) Methods of assessment of knowledge acquired   • Written exams, Assignments.
b. Cognitive Skills

(i) Description of cognitive skills to be developed
 	
    4. Identify appropriate methods of problem modelling and solving.
    5. Identify a range of solutions and critically evaluate and justify proposed design solutions.
    6. Solve computer science related problems using sets, sequences, probabilities, logic and graphs.

(ii) Teaching strategies to be used to develop these cognitive skills   • Lectures, Tutorials, Discussion.
(iii) Methods of assessment of student's cognitive skills   • Written exams, Assignments.
c. Interpersonal Skills and Responsibility
(i) Description of the interpersonal skills and capacity to carry responsibility to be developed   2. Gain the skills of creative thinking.
(ii) Teaching strategies to be used to develop these skills and abilities   • Lectures, Tutorials, Discussion.
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility   • Written exams, Assignments.
d. Communication, Information Technology and Numerical Skills
(i) Description of the skills to be developed in this domain

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- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of students numerical and communication skills

- None.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

No	Assessment task	Week due	Proportion of Final Assessment
	5. Schedule of Assessment Tasks for Students During the Semester		
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Assignments	1-15	20
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)

- Susanna S. Epp, Introduction to Discrete Structures with Applications, Cengage Learning, 4th Edition, 2010.

2. Essential References

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• Bernard Kolman, Robert Busby and Sharon C. Ross, Discrete Mathematical Structures, Pearson, 6th Edition, 2008.
3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List) • **None.**
4- Electronic Materials, Web Sites etc. • UQU e-learning portal.
5- Other learning material such as computer-based programs/CD, professional standards/regulations • None.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.) • Classroom with 35 seats for students.
2. Computing resources • None.
3. Other resources • None.

G. Course Evaluation and Improvement Processes

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

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DIGITAL LOGIC DESIGN

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Digital Logic Design	23162201-3
2. Credit hours:	3	
3. Program(s) in which the course is offered:		Computer Science Information Systems
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)
5. Level/year at which this course is offered		3/2
6. Pre-requisites for this course (if any)		Computer Programming Skills (23161101-3)
7. Co-requisites for this course (if any)		None
8. Location if not on main campus		Jamoum Campus

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
This course gives the student an overview of the numbers and uses electronic, as well as how to represent binary codes, and logic gates.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Fundamentals of Electricity, main components and Introduction to Semiconductor Devices	3	9
Number System (Decimal, Octal, Hexadecimal)	2	6
Boolean Algebra and Logic gates	2	6
Simplification of Boolean Functions	2	6
Combinational Circuits	2	6
Medium Scale Integrated Circuits	2	6
Sequential Circuits	2	6

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

1. Apply the knowledge of various number system in conversion and in arithmetic operations.
2. Apply the principles of Boolean Algebra to manipulate and minimize logic expressions and to design simple logic circuits as per requirement.
3. Understand the problem/requirement, do analysis and design, and implement on simulator as per requirement.
4. Demonstrate and carry out the mini project in a group on Simulator.
5. Design working model of combinational and sequential logic circuits and to integrate as per requirement.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Tutorials.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

1. Use appropriate logic and electrical circuits to design simple combinational and sequential circuit.

(ii) Teaching strategies to be used to develop these cognitive skills

- Lectures, Tutorials.

(iii) Methods of assessment of student's cognitive skills

- Written exams, Assignments.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

- None

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(ii) Teaching strategies to be used to develop these skills and abilities

- None

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- None

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

- Demonstrate efficient design capabilities.

(ii) Teaching strategies to be used to develop these skills

- Lectures, Tutorials.

(iii) Methods of assessment of students numerical and communication skills

- Written exams, Assignments.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Assignments	16	20
4	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

- 2-4 office hours per weeks.

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- E-mail communication.

E. Learning Resources

1. Required Text(s)
- Morris Mano, Digital Logic Design, Prentice Hall, 4th Edition, 2006
- Paul Horowitz , The Art of Electronics 3rd Edition, 2015.

2. Essential References
- None

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- None

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- None
3. Other resources
- None.

G. Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching
- Course evaluation surveys.
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department
- None.

3. Processes for Improvement of Teaching
- Course action plans.
4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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COMPUTER ORGANIZATION & ARCHITECTURE

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Computer Organization & Architecture	23162202-4
2. Credit hours:		
3. Program(s) in which the course is offered:	Computer Science Information Systems	
4. Name of faculty member responsible for the course:	The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered	4/2	
6. Pre-requisites for this course (if any)	Design Logic Design (23162201-4)	
7. Co-requisites for this course (if any)	None	
8. Location if not on main campus	Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
Upon completing this course, the students will be familiar with main concepts of computer architecture, Hardware components of a computer, Instruction set, instruction formats, encoding of instructions, types, Execution unit, registers design, combinational shifters, ALU, division and multiplication algorithms, Control unit, register transfer language, hardwired and microprogrammed control unit, Memory unit, RAM, cache memory, associative memory, virtual memory, Input/output, Introduction to Assembly Language, Introduction multiprocessor systems and parallel processing.

2. Briefly describe 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

1. Topics to be Covered		
List of Topics	No of Weeks	Contact hours
Introduction: Computer System, Computer Components.	1	5
Computer Evolution and Performance: Generations of Computers, Evolution of processors, memory, interconnection system.	2	10
A Top-Level View of Computer Function and Interconnection: Computer Components, Computer Functions, Interconnection Structures, Bus Interconnection.	2	10
Main Memory, Error Correction, Advanced DRAM Organization.	2	10

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Cache Memory: Computer Memory System Overview, Cache Memory Principles, Elements of Cache Design.	2	10
External Memory: Magnetic Disk, RAID, Solid State Drives, Optical Memory, Magnetic Tape.	2	10
Input / Output: External Devices, I/O Modules, I/O Channels and Processors.	2	10
Central Processing Unit: Instruction Sets, Machine Instruction Characteristics, Types of Operands, Types of Operations, Instruction Sets.	2	10

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	30	0	0

3. Additional private study/learning hours expected for students per week.
    2-4 hours/week.

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

1. Students will be familiar with the computer system concepts, computer evolution and performance.
2. Students will understand the Top-Level View of Computer System.
3. Students will understand the Internal Memory's structure and function.
4. Students will understand the Cache Memory's structure and function.
5. Students will understand the External Memory's structure and function.
6. Students will understand the Input / Output devices.
7. Students will understand the principles of building chips for different memory types.
8. Students will understand the Central Processing Unit structure and function.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Tutorials, case study.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

1. Design and analyze the main functional units of a computer.
2. Design and analyze a sample Instruction set for a theoretical machine.
3. Compare between the different computer systems structures according to certain criteria.
4. Compare between the different computer systems performance according to certain criteria.

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(ii) Teaching strategies to be used to develop these cognitive skills	
• Lectures, Tutorials.	
(iii) Methods of assessment of student's cognitive skills	
• Written exams, Assignments.	

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed
• None
(ii) Teaching strategies to be used to develop these skills and abilities
• Lectures, Tutorials.
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility
• Written exams, Assignments.

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.
1. Demonstrate efficient hardware understanding.
(ii) Teaching strategies to be used to develop these skills
• Lectures, Tutorials.
(iii) Methods of assessment of students numerical and communication skills
• Written exams, Assignments.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required
• None.
(ii) Teaching strategies to be used to develop these skills
• None.
(iii) Methods of assessment of student's psychomotor skills
• None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment

1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Assignments: H/W & Projects	All weeks	20
4	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- Computer Organization and Architecture, Designing for Performance, 9th Edition, William Stallings, Pearson Education, 2013.
- Structured Computer Organization, Fourth or fifth edition, Andrew S. Tanenbaum, Prentice-Hall / Pearson, 2006.

2. Essential References
- None.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- None

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- None

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

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3. Processes for Improvement of Teaching   • Course action plans.
4. Processes for Verifying Standards of Student Achievement   • Student outcomes assessment.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.   • The student outcomes assessment process is carried every other year.

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DATA STRUCTURES

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Data Structures	23163106-3
2. Credit hours:	3	
3. Program(s) in which the course is offered:	Computer Science Information Systems	
4. Name of faculty member responsible for the course:	The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered	5/3	
6. Pre-requisites for this course (if any)	Discrete Structures II (23162105-3) Object-Oriented Programming (23162104-4)	
7. Co-requisites for this course (if any)	None	
8. Location if not on main campus	Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course. Upon completing, the student will learned fundamental principles of computer programming, with an emphasis on basic concepts of data and their representations inside a computer (scalar, structured and dynamic). Moreover, he will be able to manipulate abstract data structures including arrays, linked lists, strings, stacks, queues, trees and graphs. Finally, he will learn all of the mentioned concepts and techniques using JAVA language.
2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Abstract Data Types, Arrays and Pointers	1	4
Classes and Recursion	1	4
Arrays	1	4
Linked Lists	3	12
Stack	1	4
Queue	1	4
Heaps	2	8
Trees and Traversals	2	8
Graphs	2	8

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Memory Management	1	4

2. Course components (total contact hours per semester):				
Lecture	**Tutorial**	**Laboratory**	**Practical/Field work/Internship**	**Other: None**
30	**0**	**30**	**0**	**0**

3. Additional private study/learning hours expected for students per week.
    4-5 hours/week.

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

1. Understand the data structures: linked lists, trees, stacks and queues and write stacks, and queues applications.
2. Design and implement efficient algorithms for manipulating data structures.
3. Understand the characteristics of hash tables for access and retrieval.
4. Apply and analyze the learned data structures techniques to write efficient codes.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Projects, Oral exams and Discussions.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments and Project Discussions.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

1. Use dynamic data structures to design advanced computer programs.

(ii) Teaching strategies to be used to develop these cognitive skills

- Lectures, Projects and Discussions.

(iii) Methods of assessment of student's cognitive skills

- Written exams, Assignments, Oral exams and Project Discussion.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

1. Ability to work within a team during the project
2. Learn how to use developed data structures to write a program.

(ii) Teaching strategies to be used to develop these skills and abilities

- None.

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(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- None.

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.
   1. Report writing and present reports, communicate orally, discuss and defend his ideas.
   2. Work cooperatively and effectively in a group to prepare the projects

(ii) Teaching strategies to be used to develop these skills

- Lectures, Projects and Discussion.

(iii) Methods of assessment of students numerical and communication skills

- Written exams, Assignments and Project Discussion.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

No	Assessment task	Week due	Proportion of Final Assessment
**5. Schedule of Assessment Tasks for Students During the Semester**
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Projects	16	20
4	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)

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- Michael T. Goodrich, Roberto Tamassiaand Michael H. Goldwasser, *Data Structures and Algorithms in Java*", 6th Edition, 2014.

2. Essential References
- Duane A. Bailey **, "**Java Structures, Data Structures in Java for the Principled Programmer", 7thedition, 2014.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- Software: JAVA software, Basic applications.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- Software: JAVA software, Basic applications.
- Internet Access.

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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NUMERICAL METHODS

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Numerical Methods	23163107-4
2. Credit hours:	4	
3. Program(s) in which the course is offered:	Computer Science Information Systems	
4. Name of faculty member responsible for the course:	The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered	5/3	
6. Pre-requisites for this course (if any)	Liner Algebra I (23042243-4) Computer Programming (23162102-4)	
7. Co-requisites for this course (if any)	None	
8. Location if not on main campus	Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

Upon completing this course the student will have learned, through appropriate classroom and laboratory experiences, how to utilize the computer to solve scientific computational problems including curve fitting, function approximation and interpolation, numerical differentiation and integration, and nonlinear equations. Moreover, he/she will gain skills of integrating programming and numerical methods to solve complex applied problems using mathematical software packages.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Floating-point arithmetic.	2	10
Systems of linear equations.	3	15
Nonlinear equations.	3	15
Interpolation and function approximation.	2	10
Numerical differentiation and integration.	2	10
Numerical algorithmic development using mathematical software packages.	3	15

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

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Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	**0**	**30**	**0**	**0**

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

1. Demonstrate basic knowledge and understanding of a core of analysis, algebra and applied mathematics.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Tutorials, Discussion.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

1. Determining errors present in numerical solutions to scientific computational problems.
2. Design numerical algorithms and develop programs to approximately solve mathematical problems.

(ii) Teaching strategies to be used to develop these cognitive skills

- Lectures, Tutorials, Projects, Discussion.

(iii) Methods of assessment of student's cognitive skills

- Written exams, Assignments, Project Discussion, Simulation.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

1. Gain the skills of creative thinking.

(ii) Teaching strategies to be used to develop these skills and abilities

- Lectures, Tutorials, Projects, Discussion.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- Written exams, Assignments, Project Discussion, Simulation.

d. Communication, Information Technology and Numerical Skills

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(i) Description of the skills to be developed in this domain
1. Deploy effectively the software packages used for scientific applications.
(ii) Teaching strategies to be used to develop these skills
• Lectures, Tutorials, Projects, Discussion.
(iii) Methods of assessment of students numerical and communication skills
• Written exams, Assignments, Project Discussion, Simulation.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required
• None.
(ii) Teaching strategies to be used to develop these skills
• None.
(iii) Methods of assessment of student's psychomotor skills
• None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	15
2	Midterm Exam 2	12-13	15
3	Assignments	1-15	15
4	Projects	16	15
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- A. Quarteroni, F. Saleri, P. Gervasio, Scientific Computing with MATLAB and Octave, Springer, 4th Edition, 2014.

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2. Essential References

- R.L. Burden, J.D. Faires, A.M. Burden, Numerical Analysis, Cengage Learning, 10th Edition, 2015.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)

- **None.**

4- Electronic Materials, Web Sites etc.

- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations

- Software: Mathematical Software Packages.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)

- Classroom with 35 seats for students.
- General computer laboratories (max 20 students per session).

2. Computing resources

- Software: Mathematical Software Packages.
- Internet Access.

3. Other resources

- None.

G. Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Course evaluation surveys.

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

- None.

3. Processes for Improvement of Teaching

- Course action plans.

4. Processes for Verifying Standards of Student Achievement

- Student outcomes assessment.

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

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

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Algorithms
NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Algorithms		23163108-4
2. Credit hours:	4		
3. Program(s) in which the course is offered:		Computer Science	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		5/3	
6. Pre-requisites for this course (if any)		Discrete Structures II (23162105-3) Object-Oriented Programming (23162104-4)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
The objective of this course is to study design and analysis of algorithms. Learning different algorithms design strategies such as divide and conquer, dynamic programming, and greedy approach. Applications involve: sorting and searching, trees/graph, geometric algorithms, and string matching algorithms. Analysis of algorithms is essential part of this course. Study worst case, average case, and amortized analysis with an emphasis on the close connection between the time complexity of an algorithm and the underlying data structures.
2. Briefly describe 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

1. Topics to be Covered		
List of Topics	No of Weeks	Contact hours
Basic Concepts in Algorithmic Analysis	1	5
Searching & Sorting	1	5
Recurrence Relations and Recursion	1	5
Divide and Conquer	1	5
Graph Algorithms	3	15
Greedy Approach	1	5
Dynamic Programming	2	10
String Matching	2	10
Time and Space Complexity	2	10

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P and NP Problems	1	5

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	30	0	0

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

    4-5 hours/week.

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

1. Understand asymptotic notation of time analysis and complexity.
2. Know a variety of useful algorithms.
3. Know and understand the principles and techniques for algorithm design.
4. Understand the essential mathematics relevant to algorithms.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Projects, Oral exams and Discussions.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments and Project Discussions.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

1. Evaluate algorithms in terms of their time analysis within the given problem.
2. Specify and apply the main methodologies for designing algorithms.

(ii) Teaching strategies to be used to develop these cognitive skills

- Lectures, Projects and Discussions.

(iii) Methods of assessment of student's cognitive skills

- Written exams, Assignments, Oral exams and Project Discussion.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

3. Manage tasks effectively.
4. Manage one's own learning and development, including time management.
5. Search for information and adopt life-long self-learning.

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(ii) Teaching strategies to be used to develop these skills and abilities • None.	
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility • None.	

d. Communication, Information Technology and Numerical Skills

(ii) Description of the skills to be developed in this domain.
   3.   Report writing and present reports, communicate orally, discuss and defend his ideas.
   4.   Work cooperatively and effectively in a group to prepare the projects

(ii) Teaching strategies to be used to develop these skills • Lectures, Projects and Discussion.
(iii) Methods of assessment of students numerical and communication skills • Written exams, Assignments and Project Discussion.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required • None.
(ii) Teaching strategies to be used to develop these skills • None.
(iii) Methods of assessment of student's psychomotor skills • None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Projects	16	20
4	Final Exam	17-18	40
		Total	100

D. Student Support

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

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E. Learning Resources

1. Required Text(s) • Cormen, Leiserson, Rivest, Stein, Introduction to Algorithms, (second edition) MIT Press, 2002.
2. Essential References • S. Dasgupta, C. H. Papadimitriou, and U. V. Vazirani, Algorithms, McGraw-Hill, 2007.
3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List) • **None.**
4- Electronic Materials, Web Sites etc. • UQU e-learning portal.
5- Other learning material such as computer-based programs/CD, professional standards/regulations • Software: JAVA software, Basic applications.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.) • Classroom with 35 seats for students.
2. Computing resources • Software: JAVA software, Basic applications. • Internet Access.
3. Other resources • None.

G. Course Evaluation and Improvement Processes

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

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COMPILER CONSTRUCTION

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Compiler Construction	23163109-3
2. Credit hours:	3	
3. Program(s) in which the course is offered:		Computer Science
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)
5. Level/year at which this course is offered		6/3
6. Pre-requisites for this course (if any)		Data Structures (23163106-3)
7. Co-requisites for this course (if any)		None
8. Location if not on main campus		Jamoum Campus

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
Students should learn the basic techniques that underlie the practice of compiler construction, and its phases. Moreover, they should be able to deal with compiler techniques and problems such as; ambiguous grammar, parsing types, and generating target codes, etc.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Overview of Compilation	1	3
Scanners	3	9
Parsers	3	9
Code generations	2	6
Runtime environments	2	6
Register allocation	2	6
Code optimization	2	6

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None

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45	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

1. Recognize and use terminology and formalisms related to grammars for programming languages and compiler construction.
2. Understand the intermediate code representation, symbol tables, run-time structures, code generation, and compiler construction tools.
3. Identify and describe the concepts underlying the components of a compiler including a scanner, parser, and code generator.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Self-study, Discussion.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

1. Define the basic components of a compiler including the scanner, parser, code generator, and symbol table.

(ii) Teaching strategies to be used to develop these cognitive skills

- Lectures, Projects, Self-study, Discussion.

(iii) Methods of assessment of student's cognitive skills

- Written exams, Assignments, Project Discussion.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

1. Demonstrate the ability to work effectively in teams.

(ii) Teaching strategies to be used to develop these skills and abilities

- Projects.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- Project Discussion.

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d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

    1. Demonstrate efficient programming skills.

(ii) Teaching strategies to be used to develop these skills

- Projects.

(iii) Methods of assessment of students numerical and communication skills

- Project Discussion.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

No	Assessment task	Week due	Proportion of Final Assessment
**5. Schedule of Assessment Tasks for Students During the Semester**			
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
4	Projects	16	20
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)

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- Alfred V. Aho, Monica S. Lam, Ravi Sethi, and Jeffrey D. Ullman, Compilers: Principles, Techniques & Tools, Addison Wesley, 2nd Edition, 2007.

2. Essential References
- Keith Cooper, Linda Torczon, Engineering a Compiler, Morgan Kaufmann, 2nd Edition, 2011.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- C++ IDE.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- Software: C++ IDE.
- Internet Access.
- Specialized computer laboratories (max 16 students per session).
  - o Free Lab

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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COMPUTER NETWORKS

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Computer Networks	23163203-4
2. Credit hours:	4	
3. Program(s) in which the course is offered:	Computer Science	
4. Name of faculty member responsible for the course:	The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered	6/3	
6. Pre-requisites for this course (if any)	Discrete Structures II (23162105-3)	
7. Co-requisites for this course (if any)	None	
8. Location if not on main campus	Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course. Upon completing this course, students should be able to understand fundamental network terminologies and concepts, e.g. protocols, Open System Interconnection (OSI), TCP/IP models, Ethernet, Internet Protocol (IP) addressing, routing protocols and network devices, such as routers and switches. Moreover, the students should understand the interconnections of various networks and to be able to design and configure small-scaled networks given some typical (customers) requirements.
2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Introduction	1	5
Protocols and Layering.	1	5
OSI and Internet models.	2	10
The Physical Layer	1	5
The Data Link Layer	1	5
The Medium Access Control Sublayer	1	5
The Network Layer	1	5
Ethernet, Congestion control and Routing	2	10
Internet Protocol (IP)	1	5
The Transport Layer	1	5

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UDP and TCP	1	5
The Application Layer	1	5
Telnet, FTP, SMTP,etc…	1	5

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	30	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

 5. Understand and analyze the hardware and software components of a network and the real implementations of these concepts.
 6. Understand networking protocols and their hierarchical relationship hardware and software. Compare protocol models and select appropriate protocols for a particular design.
 7. List 7 layers of the OSI Model and compare them to the layering used in the Internet model (TCP/IP).
 8. Explain the differences between a hub, switch (bridge), and a router and the relationship between 802.1D bridge and a modern switch.

(ii) Teaching strategies to be used to develop that knowledge

  • Lectures, Projects, and Discussion.

(iii) Methods of assessment of knowledge acquired

  • Written exams, Assignments and Project Discussion.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

On completing the course, the student should be able to:
  • Distinguish between the concepts and principles behind various Networking techniques.
  • Distinguish between the concepts and principles, theories, and practices behind addressing, routing and congestion avoiding techniques.

(ii) Teaching strategies to be used to develop these cognitive skills

  • Lectures, Projects and Discussion.

(iii) Methods of assessment of student's cognitive skills

  • Written exams, Assignments, Oral exams, Project Discussion and Demo.

c. Interpersonal Skills and Responsibility

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(i)	Description of the interpersonal skills and capacity to carry responsibility to be developed
	• None.

(ii) Teaching strategies to be used to develop these skills and abilities

 • None.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

 • None.

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.
 • Demonstrate efficient IT capabilities.

(ii) Teaching strategies to be used to develop these skills

 • Lectures, Projects, Discussion.

(iii) Methods of assessment of students numerical and communication skills

 • Written exams, Assignments, Project Discussion and Demo.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

 • None.

(ii) Teaching strategies to be used to develop these skills

 • None.

(iii) Methods of assessment of student's psychomotor skills

 • None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Projects	16	20
4	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- Andrew S. Tanenbaum and David J. Wetheral. Computer Networks, Pearson, 5th Edition, 2010.

2. Essential References
- James F. Kurose &Keith W. Ross, Computer Networking: A Top-Down Approach (6th Edition) 6th Edition. 2012.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- **None.**

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- Internet Access.
- Specialized computer laboratories (max 16 students per session).
  - Network Lab

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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OPERATING SYSTEMS
NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Operating Systems	23163301-4
2. Credit hours:	4	
3. Program(s) in which the course is offered:		Computer Science
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)
5. Level/year at which this course is offered		5/3
6. Pre-requisites for this course (if any)		Computer Organization & Architecture (23162202-4) Object-Oriented Programming (23162104-4)
7. Co-requisites for this course (if any)		None
8. Location if not on main campus		Jamoum Campus

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
This course introduces the theory and practice behind modern computer operating systems. The teaching approach covers both a theoretical perspective; the abstractions and algorithms, as well as a practical one; the mechanisms and how they are built.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Introduction	2	10
Operating System Structures	1	5
Processes	2	10
Threads	1	5
CPU Scheduling	2	10
Process Synchronization	2	10
Deadlocks	2	10
Main Memory	3	15

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	30	0	0

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

3-4 hours/week.

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

1. Understand the design and function of an operating system.
2. Explain a process and how processes are synchronized and scheduled.
3. Know different approaches for memory management.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Research, and Self-study.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments, and Reports.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

1. Use appropriate programming languages to design simple O.S modules.

(ii) Teaching strategies to be used to develop these cognitive skills

- Projects, Case study, Research, Self-study, and Discussion.

(iii) Methods of assessment of student's cognitive skills

- Assignments, Reports, Demo, and Presentation.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

1. Learn how to search the literature for trends in modern O.S.

(ii) Teaching strategies to be used to develop these skills and abilities

- Case study, Research, Self-study, and Discussion.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- Reports, Project Discussion and Demo, and Presentation.

d. Communication, Information Technology and Numerical Skills

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(i) Description of the skills to be developed in this domain.

   1. Apply practical data structures and algorithms to implement simple OS modules.

(ii) Teaching strategies to be used to develop these skills

   • Lectures, Case study, Research, Self-study, and Discussion.

(iii) Methods of assessment of students numerical and communication skills

   • Assignments, Reports, and Project Discussion and Demo.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

   • None.

(ii) Teaching strategies to be used to develop these skills

   • None.

(iii) Methods of assessment of student's psychomotor skills

   • None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	15
2	Midterm Exam 2	12-13	15
3	Quizzes	4-9	10
4	Homework	3-10	10
5	Survey Term Paper	16	10
6	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
   • J Peterson & A. Silberschatz, Operating System Concepts, 8th Edition, 2008.

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2. Essential References
- Andrew S. Tanenbaum, Modern Operating Systems, 3rd Edition, 2007.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- Software: Linux O.S.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- Specialized computer laboratories (max 16 students per session).
  - Free Lab

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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DATABASE I

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Database I		23163302-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science Information Systems	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		5/3	
6. Pre-requisites for this course (if any)		Object-Oriented Programming (23162104-4)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
Upon the completion of this course, the student will have learned, through appropriate classroom the basic concepts to design, create and implement database systems.
2. Briefly describe 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

1. Topics to be Covered		
List of Topics	No of Weeks	Contact hours
Introduction to database systems	1	3
Database System Concepts and Architecture	1	3
Data Modeling Using the Entity-Relationship (ER)	2	6
Enhanced Entity-Relationship (EER) Model	2	3
ER/EER to Relational Model Mapping	2	6
Functional Dependencies and Normalization for Relational Databases	2	6
Relational Algebra Operations	2	6
SQL: Data Definition Language	1	3
SQL: Data Manipulating Language	2	6

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

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Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
39	**0**	**0**	**0**	**0**

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

1. Understand database concepts, applications and languages.
2. Understand data models, schemas and instances.
3. Implement the relational database design and data modeling using entity-relationship (ER) model.
4. Understand the concepts of constraints and relational algebra operations.
5. Implement SQL: Data definition, constraints, schema, queries and operations in SQL
6. Produce well-structured database using functional dependencies and normalization.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Tutorials, Discussion, Case Study.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

- Understand the concepts of data modeling and database design

(ii) Teaching strategies to be used to develop these cognitive skills

- Lectures, Tutorials, Discussion.

(iii) Methods of assessment of student's cognitive skills

- Written exams, Assignments.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

- None.

(ii) Teaching strategies to be used to develop these skills and abilities

- None.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

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• None.	

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.
• None.
(ii) Teaching strategies to be used to develop these skills
• None.
(iii) Methods of assessment of students numerical and communication skills
• None.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required
• None.
(ii) Teaching strategies to be used to develop these skills
• None.
(iii) Methods of assessment of student's psychomotor skills
• None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Projects	16	20
4	Final Exam	17-18	40
		Total	100

D. Student Support

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

E. Learning Resources

1. Required Text(s)

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- R. Elmasri and S.B. Navathe, Fundamentals of Database Systems, Addison-Wesley, 6th Edition, 2011.

2. Essential References
- T.M. Connolly, C. Begg and A.D. Stroahn, Database Systems: A practical to design, implementation and management, Course Technology, 10th Edition, 2012.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- None.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- None.

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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COMPUTER GRAPHICS
NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Computer Graphics	23163401-3
2. Credit hours:	3	
3. Program(s) in which the course is offered:		Computer Science
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)
5. Level/year at which this course is offered		6/3
6. Pre-requisites for this course (if any)		Object-Oriented Programming (23162104-4) Linear Algebra I (23042243-4)
7. Co-requisites for this course (if any)		None
8. Location if not on main campus		Jamoum Campus

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
The course offers an introduction to computer graphics, algorithms, and software. Topics include overview of graphics algorithms, 2D line drawing, 2D and 3D geometric transformations, 2D and 3D viewing, 2D and 3D clipping, 2D and 3D object representation.
2. Briefly describe 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

1. Topics to be Covered		
List of Topics	No of Weeks	Contact hours
Introduction to graphics	1	4
Mathematical Foundation for Graphics	2	8
2D graphics algorithms	3	12
2D and 3D Transformation and representation	3	12
2D viewing	2	8
3D Object Representations	3	12

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3D viewing	1	4

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
30	0	30	0	0

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

3-4 hours/week.

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

1. Develop and understanding of design fundamentals, classic themes and mechanisms, and different approaches of representation.
2. Understand the overall human context in which computer graphics activities take place.
3. Geometric Modeling, Problem Solving, Applying Technology, Graphic Designing, Computer Programming.
4. Develops skills and knowledge critical to all areas of computer graphics specialization.
5. Develop conceptual principles, processes, and techniques essential to all areas of computer graphics.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Tutorials, Practical sessions, Projects, Discussion, Workshops.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments, Practical exams, Reports, Project Discussion and Demo, Presentation, Simulation.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

Use current computing and modeling/design tools such as BGI, OpenGL, Blender, etc.

(ii) Teaching strategies to be used to develop these cognitive skills

- Lectures, Tutorials, Practical sessions, Projects, Discussion, Workshops.

(iii) Methods of assessment of student's cognitive skills

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- Written exams, Assignments, Practical exams, Reports, Project Discussion and Demo, Presentation, Simulation.

c. Interpersonal Skills and Responsibility
(i) Description of the interpersonal skills and capacity to carry responsibility to be developed   • None
(ii) Teaching strategies to be used to develop these skills and abilities   • None.
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility   • None.

d.   Communication, Information Technology and Numerical Skills
(i) Description of the skills to be developed in this domain.   Geometric Modeling, Problem Solving, Applying Technology, Graphic Designing .
(ii) Teaching strategies to be used to develop these skills   • Lectures, Tutorials, Practical sessions, Projects, Discussion, Workshops.
(iii) Methods of assessment of students numerical and communication skills   • Written exams, Assignments, Practical exams, Reports, Project Discussion and Demo, Presentation, Simulation.

e. Psychomotor Skills (if applicable)
(i) Description of the psychomotor skills to be developed and the level of performance required   • None.
(ii) Teaching strategies to be used to develop these skills   • None.
(iii) Methods of assessment of student's psychomotor skills   • None.

5. Schedule of Assessment Tasks for Students During the Semester

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No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Practical Exams	16	10
4	Projects	16	10
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)

Donald D. Hearn, M. Pauline Baker and Warren Carithers, Computer Graphics with OpenGL, 4rd edition, 2010.

2. Essential References

Steve Marschner, Peter Shirley, Fundamentals of Computer Graphics. Fourth Edition 4th Edition, 2015

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- Software: Microsoft visual studio

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.
- General computer laboratories (max 20 students per session).

2. Computing resources
- Software: Microsoft visual studio
- Internet Access.

3. Other resources

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• None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
• Course action plans.

4. Processes for Verifying Standards of Student Achievement
• Student outcomes assessment.

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

ADVANCED PROGRAMMING

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Advanced Programming		23164110-4
2. Credit hours:	4		
3. Program(s) in which the course is offered:		Computer Science	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		7/4	
6. Pre-requisites for this course (if any)		Database I (23163302-3)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

By completing this course the students should be able to:

1. Students will be familiar with exception handling and input validation.
2. Students will gain knowledge about I/O file management and object persistence.
3. Students will be able to develop GUI-based Java applications
4. Students will learn how to use different types of collections provided in the standard library as well as the fundamental operations of Arrays and collections classes.
5. Students will learn about other advanced Java topics.
6. Students will get the experience of working in groups to design and develop complete GUI-based Java application projects.

2. Briefly describe any plans for developing and improving the course that are being implemented.

- Increase the use of the latest Web-based references material and textbooks.
- Review and update the course materials as part of preparation to teach this course.
- Gather students' opinion about their success in achieving course objectives by the end of the semester. This is done through number of survey questions that map one-to-one with course objectives.
- Review and indicate which assessment instrument(s) to be used for assessing each course outcome, and what grading rubric will be used for each instrument.

C. Course Description

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours

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Java and Object-Oriented programming overview	1	5
Recursion techniques	1	5
Java Collections	2	10
Generic Programming	2	10
File I/O	2	10
Building Graphical User Interface (GUI)	2	10
Introduction to Design patterns	1	5
Java database Connectivity (JDBC)	2	10
Multi-threading and synchronization	2	10

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	30	0	0

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

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:
- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

a. Knowledge

(i) Description of the knowledge to be acquired

Upon completion of this course, students will be able to:

3.   Choose appropriate data structures from the Java Collection API.
4.   Sort and search arrays and lists using a variety of techniques.
5.   Capture configuration and debugging information using the Java Logging APIs.
6.   Use generics to create type safe collections.
7.   Serialize Java objects.
8.   Use features of the new I/O API.
9.   Build a Graphic User Interface.
10.   Perform database queries and updates using JDBC.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Tutorials, Practical sessions, Projects, Discussion.
- Providing references and supporting reading materials for self-study.

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(iii) Methods of assessment of knowledge acquired	
• Written exams, Assignments, Practical exams, Reports, and Project Discussion.	

b. Cognitive Skills

(i) Description of cognitive skills to be developed

This course aims to enhance students programming skills by introducing them to advanced programming topics in addition to training them on Object-oriented problem solving.

(ii) Teaching strategies to be used to develop these cognitive skills

• Lectures, Tutorials, Practical sessions, Projects, Discussion.

(iii) Methods of assessment of student's cognitive skills

• Written exams, Assignments, Practical exams, Reports, and Project Discussion.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

(ii) Teaching strategies to be used to develop these skills and abilities

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

(ii) Teaching strategies to be used to develop these skills

(iii) Methods of assessment of students numerical and communication skills

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

(ii) Teaching strategies to be used to develop these skills

(iii) Methods of assessment of student's psychomotor skills

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment

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1	Quiz 1	3	5
2	Quiz 2	7	5
3	Group Project	8	20
4	Midterm Exam 2	9	20
5	Quiz 3	12	5
6	Quiz 4	14	5
7	Final Exam	Exam week	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- Java How to Program, 9th Edition, Harvey M. Deitel, Paul, J. Deitel, 20122, Prentice Hall.

2. Essential References
- Java Programming 7th edition, Joyce Farrell, 2013, Cengage Learning, ISBN 1285081951

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- Software: Java software, Basic applications.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students, a data show projector connected to a PC preferably with Internet connection and sliding board
- General computer laboratories (max 20 students per session).

2. Computing resources
- Computers
- Integrated Development Environment (e.g. NetBeans, Eclipse, JBuilder)
- Java Development Kit (JDK)
- Internet Access.
- Specialized computer laboratories (max 16 students per session).
  - Free Lab

3. Other resources

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G. Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching • Course evaluation surveys.
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department • Peer Evaluation Procedure • Instructor self-evaluation
3. Processes for Improvement of Teaching • Course action plans.
4. Processes for Verifying Standards of Student Achievement • Student outcomes assessment.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • The student outcomes assessment process is carried every other year.

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PARALLEL COMPUTING

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Parallel Computing		23164111-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		8/4	
6. Pre-requisites for this course (if any)		Data Structures (23163106-3) Operating system (23163301-4)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

This course introduces the principles, theory, and practice of parallel computing. Topics covered include Von Neumann computer architecture, Flynn's classical taxonomy, multiprocessor architecture, shared memory, distributed memory, mutual exclusion, synchronization primitive, locks, monitor, concurrent data structures and algorithms, work distribution, parallel programming models, and designing parallel programs.

- Ability to use the primitives needed to construct parallel programs.
- Appreciate how concurrent data structures and algorithms are developed.
- Appreciate the issues in distributing work and load balancing.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Introduction: concept, and terminology	2	4
Multiprocessor architecture	1	2
Shared memory, and distributed memory	2	4
Concurrent data structures and algorithms	2	4
Parallel programming models	3	6

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Designing parallel programs: partitioning, mutual exclusion, synchronization primitives, communications, data dependencies, and load balancing	3	6
Future trends in parallel computing	2	4

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
30	0	30	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

   1. Understand what a parallel computing is and why one would design a parallel program.
   2. Know how to design a parallel program to benefit from multiprocessor architecture.

(ii) Teaching strategies to be used to develop that knowledge

   • Lectures, Case study, tutorials, and Self-study.

(iii) Methods of assessment of knowledge acquired

   • Written exams, Assignments, and Reports.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

   1. Adapt and design parallel algorithms for execution in multiprocessors architectures, analyze the algorithms for correctness, reliability, security, and performance and to solve deadlocks problems in distributed systems.

(ii) Teaching strategies to be used to develop these cognitive skills

   • Lectures, Case study, Research, Self-study, and Discussion.

(iii) Methods of assessment of student's cognitive skills

   • Written exams, Assignments, Reports, Project Discussion and Demo.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

   • None.

(ii) Teaching strategies to be used to develop these skills and abilities

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- None.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility
• None.

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.
• None.

(ii) Teaching strategies to be used to develop these skills
• None.

(iii) Methods of assessment of students numerical and communication skills
• None.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required
• None.

(ii) Teaching strategies to be used to develop these skills
• None.

(iii) Methods of assessment of student's psychomotor skills
• None.

5. Schedule of Assessment Tasks for Students During the Semester			
No	**Assessment task**	**Week due**	**Proportion of Final Assessment**
1	Midterm Exam 1	5-7	15
2	Midterm Exam 2	12-13	15
3	Quizzes/Homework	4-9	10
4	Projects	4-16	20
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.
• 2-4 office hours per weeks.

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- E-mail communication.

E. Learning Resources

1. Required Text(s)
- Zbigniew J. Czech, Introduction to Parallel Computing, Cambridge University Press; 1st edition, 2017.

2. Essential References
- Maurice Herlihy and Nir Shivat, Art of Multiprocessor Programming, Morgan Kaufmann; 1st. edition, 2012.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- None.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- Internet Access.

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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SOFTWARE ENGINEERING I

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Software Engineering I		23164303-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science Information Systems	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		7/4	
6. Pre-requisites for this course (if any)		Database I (23163302-3)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

Topics covered in this course include: systems, roles, and development methodologies, system development lifecycle, understanding and modeling organizational systems, project management and creating a feasibility report, information gathering, using data flow diagrams, process specification and structured decisions, and designing effective output and input.

- Present fundamental concepts such as systems, requirements, events,
- and objects.
- Establish the role of information systems in organizations, and how they are related to organizational objectives and structures.
- Understand the system development life cycle and study its phases.
- Develop of system requirements.
- Study the analysis and design processes, and understand the transition from analysis to design.
- Practice various diagrams used to construct system models.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Systems, Roles and Development Methodologies	1	3

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Understanding and Modeling Organizational Systems	1	3
Project Management	2	6
Information Gathering Techniques	2	6
Data Flow Modelling I	2	6
Data Flow Modelling II	2	6
Conceptual Modelling	2	6
Process Specifications and Structured Decisions	2	6
Design Effective HCI (Output & input)	1	3

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

  3-4 hours/week.

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

  1. Apply software engineering theory, principles, tools and processes to the development and maintenance of complex, scalable software systems.
  2. Analyze, design, verify, validate, implement, apply, and maintain software systems.
  3. Work in one or more significant application domains.
  4. Manage the development of software systems.
  5. Define and assess software quality and software development processes for appropriate applications in different domain areas.

(ii) Teaching strategies to be used to develop that knowledge

  • Lectures, Tutorials, Projects, Case study, Discussion, Role playing.

(iii) Methods of assessment of knowledge acquired

  • Written exams, Assignments, Oral exams, Reports, Project Discussion and Demo, Presentation.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

  1. Use appropriate diagrams and notations to express a system at the analysis level and move it toward the design and implementation levels in the development lifecycle.

(ii) Teaching strategies to be used to develop these cognitive skills

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- Lectures, Tutorials, Projects, Case study, Discussion, Role playing.

(iii) Methods of assessment of student's cognitive skills

- Written exams, Assignments, Oral exams, Reports, Project Discussion and Demo, Presentation.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

- None.

(ii) Teaching strategies to be used to develop these skills and abilities

- None.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- None.

d.   Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

   2.   Demonstrate efficient software design skills.

(ii) Teaching strategies to be used to develop these skills

- Lectures, Projects, Case study, Discussion.

(iii) Methods of assessment of students numerical and communication skills

- Written exams, Assignments, Reports, Project Discussion and Demo, Presentation.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment

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1	Midterm Exam 1	5-7	15
2	Midterm Exam 2	12-13	15
3	Projects	16	30
4	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)

- K.E. Kendall and J. E. Kendall, Systems Analysis and Design, 9th Edition, Pearson, 2014.

2. Essential References

- J.L. Whitten, L.D. Bentley and K.C. Dittman, System Analysis and Design Methods, McGraw-Hill, 2002.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)

- None.

4- Electronic Materials, Web Sites etc.

- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations

- None.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)

- Classroom with 35 seats for students.

2. Computing resources

- None.

3. Other resources

- None.

G. Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Course evaluation surveys.

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

- None.

3. Processes for Improvement of Teaching

- Course action plans.

4. Processes for Verifying Standards of Student Achievement

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- Student outcomes assessment.

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

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SOFTWARE ENGINEERING II

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Software Engineering II		23164304-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science Information Systems	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		8/4	
6. Pre-requisites for this course (if any)		Software Engineering I (23164303-3)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

This course introduces the importance of software engineering methods, techniques and tools in real projects. It also introduces students to the software engineering code of ethics. Then it introduces the different software engineering process. Finally, some software engineering activities are detailed such as requirement engineering and design using UML

- Understand the importance of Software Engineering.
- Understand the software engineering code of ethics.
- Understand some software processes and engineering approaches.
- Understand differences between plan-driven and agile processes.
- Learn the detailed activities of requirements engineering for a software systems.
- Use UML to document the design of a software system.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Introduction to Software Engineering	1	3
Project Management	2	6
Requirements Modeling	2	6

Control Flow Modeling	2	6
Behaviour Specifications	2	6
Architectural Design	2	6
Detailed Design	2	6
Software Testing	2	6

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

6. Apply software engineering theory, principles, tools and processes to the development and maintenance of complex, scalable software systems.
7. Analyze, design, verify, validate, implement, apply, and maintain software systems.
8. Work in one or more significant application domains.
9. Manage the development of software systems.
10. Define and assess software quality and software development processes for appropriate applications in different domain areas.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Tutorials, Projects, Case study, Discussion, Role playing.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments, Oral exams, Reports, Project Discussion and Demo, Presentation.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

1. Use appropriate diagrams and notations to express a system at the analysis level and move it toward the design and implementation levels in the development lifecycle.

(ii) Teaching strategies to be used to develop these cognitive skills

- Lectures, Tutorials, Projects, Case study, Discussion, Role playing.

(iii) Methods of assessment of student's cognitive skills

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- Written exams, Assignments, Oral exams, Reports, Project Discussion and Demo, Presentation.

c. Interpersonal Skills and Responsibility
(i) Description of the interpersonal skills and capacity to carry responsibility to be developed
• None.
(ii) Teaching strategies to be used to develop these skills and abilities
• None.
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility
• None.
d. Communication, Information Technology and Numerical Skills
(i) Description of the skills to be developed in this domain.
4. Demonstrate efficient software design skills.
(ii) Teaching strategies to be used to develop these skills
• Lectures, Projects, Case study, Discussion.
(iii) Methods of assessment of students numerical and communication skills
• Written exams, Assignments, Reports, Project Discussion and Demo, Presentation.
e. Psychomotor Skills (if applicable)
(i) Description of the psychomotor skills to be developed and the level of performance required
• None.
(ii) Teaching strategies to be used to develop these skills
• None.
(iii) Methods of assessment of student's psychomotor skills
• None.

5. Schedule of Assessment Tasks for Students During the Semester				
No	**Assessment task**	**Week due**	**Proportion of Final Assessment**
1	Midterm Exam 1	5-7	15
2	Midterm Exam 2	12-13	15
3	Projects	16	30
4	Final Exam	17-18	40

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	Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- Ian Sommerville, Software Engineering, 9th Edition, Addison-Wesley, 2011.

2. Essential References
- R. S. Pressman and B. Maxim, Software Engineering: A Practitioner's Approach, 8th Edition, 2014.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- None.

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- None.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- None.

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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

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USER INTERFACE DESIGN

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	User Interface Design	23164305-3
2. Credit hours:	3	
3. Program(s) in which the course is offered:		Computer Science
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)
5. Level/year at which this course is offered		8/4
6. Pre-requisites for this course (if any)		Advanced Programming (23164110-4)
7. Co-requisites for this course (if any)		None
8. Location if not on main campus		Jamoum Campus

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

This course aim to teach students how to develop interactive systems, including for mobile / portable devices, with a strong focus on user-centered design and usability principles. He/she will learn what characteristics of a user interface can make it usable for users, and how to design user interfaces that take into account human capabilities and constraints. This course also introduces techniques for evaluating the usability of applications and systems.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
User interface importance	2	6
Characteristics of graphical, web and mobile user interfaces	3	9
User interface design process	5	15
User interface implementation and testing	5	15

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning
a. Knowledge
(i) Description of the knowledge to be acquired   1. Design and implement a user interface, based on modeling or requirements specification.
(ii) Teaching strategies to be used to develop that knowledge   • Lectures, Projects, Discussion.
(iii) Methods of assessment of knowledge acquired   • Written exams, Assignments, Reports, Project Discussion and Demo, Presentation.
b. Cognitive Skills
(i) Description of cognitive skills to be developed   1. Analyze and model requirements and constraints for the purpose of designing and implementing user interfaces for software applications.
(ii) Teaching strategies to be used to develop these cognitive skills   • Lectures, Projects, Discussion.
(iii) Methods of assessment of student's cognitive skills   • Written exams, Assignments, Reports, Project Discussion and Demo, Presentation.
c. Interpersonal Skills and Responsibility
(i) Description of the interpersonal skills and capacity to carry responsibility to be developed   1. Participate in a small team to design and implement a user interface, based on modeling or requirements specification.
(ii) Teaching strategies to be used to develop these skills and abilities   • Projects.
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility   • Project Discussion and Demo, Presentation.
d. Communication, Information Technology and Numerical Skills
(i) Description of the skills to be developed in this domain.   • None.
(ii) Teaching strategies to be used to develop these skills   • None.
(iii) Methods of assessment of students numerical and communication skills   • None.
e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required	
• None.	

(ii) Teaching strategies to be used to develop these skills	
• None.	

(iii) Methods of assessment of student's psychomotor skills	
• None.	

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Projects	16	20
4	Final Exam	17-18	40
		Total	100

D. Student Support

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

E. Learning Resources

1. Required Text(s)
• W.O. Galitz, The Essential Guide to User Interface Design: An Introduction to GUI Design Principles and Techniques, Wiley, 3rd Edition (2007).

2. Essential References
• None.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
• **None.**
4- Electronic Materials, Web Sites etc.
• UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
• None.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
• Classroom with 35 seats for students.

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2. Computing resources
- Internet Access.
- Specialized computer laboratories (max 16 students per session).
  - Free Lab

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

ARTIFICIAL INTELLIGENCE

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Artificial Intelligence	23164402-4
2. Credit hours:	4	
3. Program(s) in which the course is offered:	Computer Science	
4. Name of faculty member responsible for the course:	The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered	7/4	
6. Pre-requisites for this course (if any)	Algorithms (23163108-4)	
7. Co-requisites for this course (if any)	None	
8. Location if not on main campus	Jamoum Campus	

B. Objectives

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1. Summary of the main learning outcomes for students enrolled in the course.
This course introduces the basic concepts of Artificial Intelligence (AI) through covering a broad spectrum of AI concepts and methods, and apply them to solve AI problems.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Introduction	1	5
Intelligent Agents	2	10
Solving Problems by Searching	3	15
Logical Agents	1	5
Planning	1	5
Knowledge Representation	2	10
Intelligent Systems	2	10
Machine Learning	3	15

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	30	0	0

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

4. Development of Learning Outcomes in Domains of Learning
a. Knowledge
(i) Description of the knowledge to be acquired
1. Identify the type of an AI problem such as search, inference, decision making under uncertainty, game theory, etc.
(ii) Teaching strategies to be used to develop that knowledge
• Lectures, Tutorials, Projects, Discussion.
(iii) Methods of assessment of knowledge acquired
• Written exams, Assignments, Reports, Project Discussion and Demo.
b. Cognitive Skills

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(i) Description of cognitive skills to be developed
1. Implement, evaluate and compare the performance of various AI algorithms.   2. Compare the difficulty of different versions of AI problems, in terms of computational complexity and the efficiency of existing algorithms.
(ii) Teaching strategies to be used to develop these cognitive skills
• Lectures, Tutorials, Projects, Discussion.
(iii) Methods of assessment of student's cognitive skills
• Written exams, Assignments, Reports, Project Discussion and Demo.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed
1. Students are required to act as a one team to design and implement a software project.
(ii) Teaching strategies to be used to develop these skills and abilities
• Projects, Discussion.
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility
• Reports, Project Discussion and Demo.

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.
1. An ability to communicate effectively with a range of audiences and within a project team.
(ii) Teaching strategies to be used to develop these skills
• Projects, Research, Discussion, Workshops.
(iii) Methods of assessment of students numerical and communication skills
• Reports, Project Discussion and Demo, Presentation.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required
• None.
(ii) Teaching strategies to be used to develop these skills
• None.
(iii) Methods of assessment of student's psychomotor skills
• None.

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No	Assessment task	Week due	Proportion of Final Assessment
	5. Schedule of Assessment Tasks for Students During the Semester		
1	Midterm Exam 1	5-7	15
2	Midterm Exam 2	12-13	15
3	Assignments	1-15	15
4	Projects	16	15
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, Prentice Hall, 3rd Edition, 2010.

2. Essential References
- David Poole and Alan Mackworth, Artificial Intelligence: Foundations of Computational Agents, Cambridge University Press, 2010.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- Software: Robot Programming.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- Software: Robot Programming.
- Internet Access.
- Specialized computer laboratories (max 16 students per session).
  o AI Lab

3. Other resources

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- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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INTERNET APPLICATIONS

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Internet Applications		23164403-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		7/4	
6. Pre-requisites for this course (if any)		Object-Oriented Programming (23162104-4)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
The course covers the essential topics in developing web applications. Explores the issues involved in designing and building enterprise web applications: client/server architectures, database access, and web services. The course ends with a group project.

2. Briefly describe 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

1. Topics to be Covered		
List of Topics	No of Weeks	Contact hours
Introduction to Internet Protocols	1	4
Dynamic Web Programming	3	12
Web App Development	2	8
Web Services	3	12
Web Search and Mining	3	12
Web Applications and Project	3	12

2. Course components (total contact hours per semester):				
Lecture	**Tutorial**	**Laboratory**	**Practical/Field work/Internship**	**Other: None**
30	**0**	**30**	**0**	**0**

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

3-4 hours/week.

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

1. Acquire skills necessary to develop web-based applications.
2. Acquire a theoretical and practical knowledge in web programming in PHP (server side).

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Projects.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments, Project Discussion.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

(ii) Teaching strategies to be used to develop these cognitive skills

- None

(iii) Methods of assessment of student's cognitive skills

- None

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

1. Demonstrate the ability to work effectively in teams.

(ii) Teaching strategies to be used to develop these skills and abilities

- Projects.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- Project Discussion.
-

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

1. Design, implement, and maintain dynamic web sites and web-based applications.
2. Design and implement programs for web applications.

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3. Use recent platforms for developing web applications.

(ii) Teaching strategies to be used to develop these skills

- Projects.

(iii) Methods of assessment of students numerical and communication skills

- Project Discussion.

e. **Psychomotor Skills (if applicable)**

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

No	Assessment task	Week due	Proportion of Final Assessment
**5. Schedule of Assessment Tasks for Students During the Semester**
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
4	Projects	16	20
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)

- Harvey M. Deitel, Paul J. Deitel, and Abbey Deitel, Internet & World Wide Web: How to Program. Prentice Hall, 5th Edition, 2011.

2. Essential References

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- Randy Connolly and Ricardo Hoar, Fundamentals of Web Development, Pearson, 2015.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
• **None.**

4- Electronic Materials, Web Sites etc.
• UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
• Software: A PHP and database servers and an IDE.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
• Classroom with 35 seats for students.

2. Computing resources
• Software: A PHP and database servers and an IDE,   • Internet Access.   • Specialized computer laboratories (max 16 students per session).   o Free Lab

3. Other resources
• None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
• Course action plans.

4. Processes for Verifying Standards of Student Achievement
• Student outcomes assessment.

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

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COMPUTER SECURITY

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Computer Security		23164404-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		8/4	
6. Pre-requisites for this course (if any)		Computer Networks (23163203-4)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
Upon completing this course, the student should understand the fundamentals of computer security and cryptography. Moreover, he should explain computer security principles, mechanisms and implementations to ensure data protection, confidentiality and integrity. In addition, the student will know how to behave in case of software vulnerability, computer security threats, attacks, and authentication problem. Finally, he will learn the fundamental methodologies for how to design and analyze security critical systems.
2. Briefly describe 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

1. Topics to be Covered		
List of Topics	No of Weeks	Contact hours
Introduction	1	3
Power supplies security	1	3
Data security	1	3
Raid technologie	1	3
Cryptography	2	6
Data integrity	1	1
Network security	1	1
Malwares	2	6
Propagation Vector and malware detection	1	3
Worms	1	3

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Web Security	1	3
Cross-site data export feature	1	3
How to Protect Yourself	1	3

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

The student will be able to:
9. Recognize vulnerabilities and select IT security products.
10. Understand current defenses techniques.
11. Understand and use encryption techniques.
12. Develop an effective security system.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Projects and Discussion.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments and Project Discussion and Demo.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

- Explain the various approaches and techniques for developing secure computer systems.
- Critically analyze and evaluate security properties and threats in computer systems
- Explain the different stages of the risk management process and be able to choose the appropriate technique in every stage.
- Evaluate and apply cryptographic functions and information in securing distributed systems

(ii) Teaching strategies to be used to develop these cognitive skills

- Lectures, Projects and Discussion.

(iii) Methods of assessment of student's cognitive skills

- Written exams, Assignments and Project Discussion and Demo.

c. Interpersonal Skills and Responsibility

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(i) Description of the interpersonal skills and capacity to carry responsibility to be developed	
• None	
(ii) Teaching strategies to be used to develop these skills and abilities	
• None	
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility	
• None	

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.
• Carry out a wide range of principles and tools available to computer security
(ii) Teaching strategies to be used to develop these skills
• Projects.
(iii) Methods of assessment of students numerical and communication skills
• Project Discussion.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required
• None.
(ii) Teaching strategies to be used to develop these skills
• None.
(iii) Methods of assessment of student's psychomotor skills
• None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
4	Projects	16	20
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- William Stallings, Network Security Essentials: Applications and Standards, 5th Edition, Pearson, 2013.

2. Essential References

- Dieter Gollmann, Computer Security 3rd Edition, Wiley, 2011.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- **None.**

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- Internet Access.
- Specialized computer laboratories (max 16 students per session).
  - Network Lab

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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SUMMER TRAINING

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Summer Training		23164501-2
2. Credit hours:	2		
3. Program(s) in which the course is offered:		Computer Science	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		8/4 (Summer semester)	
6. Pre-requisites for this course (if any)		Completing a minimum of 64 credit hours of Department Requirement (DR) courses.	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

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1. **Summary of the main learning outcomes for students enrolled in the course.**

The training experience provides students with hands-on work experience in various sectors (industrial, governmental, academic, etc.)
   1. Help students to adapt to the work environment.
   2. Help students to learn how to make decisions and to take responsibility.
   3. Help students to apply theoretical concepts into concrete practical realities.
   4. Help students to improve their communication skills.
   5. Help students to enhance their skills in writing technical reports.
   6. Apply ethical principles and commit to professional ethics, responsibility and norms of computers science practice.
   7. Give an opportunity to companies / organizations to identify distinctive cards in order to recruit them after graduation.

The duration of training is 2440 hours during the EIGHT weeks of Summer semester. The students should be able to register for summer Training just after the completion of 64 credit hours of Department Requirement (DR) courses.

The department (summer training committee) assigns a faculty member as a supervisor that should follow, advice and evaluate the students' work.

At the end of Summer training, the students are required to submit a detailed report that shows their training experiences and the gained knowledge. They are also required to give a presentation that present their training experience.

The Summer training committee carries out a rubric assessment based on the submitted report, presentation, employer evaluation letter and supervisor evaluation.

2. **Briefly describe any plans for developing and improving the course that are being implemented.**
   - Using questionnaire to collect feedback from students and employer.
   - Reviewing summer training programs of other universities to improve our proposed summer training program.

C. Course Description

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
N/A		

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
0	0	0	8 weeks during Summer Semester	0

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

4. Development of Learning Outcomes in Domains of Learning
For each of the domains of learning shown below indicate: • A brief summary of the knowledge or skill the course is intended to develop; • A description of the teaching strategies to be used in the course to develop that knowledge or skill; • The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.
a. Knowledge
(i) Description of the knowledge to be acquired • Define the tool used in practical for specific computer based systems. • Describe the practical management process for real computer based systems. • Describe the activities in development for computer based systems. • Describe the errors and state of the solution steps. • Describe the concurrent used models, tools and hardware. • Explore the industrial environed needs and limitations.
(ii) Teaching strategies to be used to develop that knowledge • Celebration with teamwork. • Sharing ideas with real work team. • Communicate effectively with field expertise.
(iii) Methods of assessment of knowledge acquired • Send a biweekly report to the field supervisor. • Presenting all the skills gained in the final report and presentation.
b. Cognitive Skills
(i) Description of cognitive skills to be developed • The ability to collect the requirements for a specific problem. • The ability to design and create design model for a specific computer based problem. • The ability to implement and test small solution for a specific computer based problem. • The ability to debug and finalize the implemented solution of a specific computer based problem. • The ability to test the overall system in computer based problem. • The ability to correct and fix system errors in a specific computer based problem.
(ii) Teaching strategies to be used to develop these cognitive skills

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- Celebration with teamwork.
- Sharing ideas with real work team.
- Communicate effectively with field expertise.

(iii) Methods of assessment of student's cognitive skills

- Send a biweekly report to the field supervisor.
- Presenting all the skills gained in the final report and presentation.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

- Apply ethical principles and commit to professional ethics, responsibility and norms of computers science practice.
- Communicate professionally as an individual and as a member or a leader in team.
- Capacity and acceptance to take responsibility for continued life-long learning relevant to professional codes of practices.

(ii) Teaching strategies to be used to develop these skills and abilities

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- Send a biweekly report to the field supervisor.
- Presenting all the skills gained in the final report and presentation.

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

- Operate on a variety of modelling and computational tools used by computer science practice.
- Demonstrates the ability to write technical reports.
- Operate on different software tools as project planning, syste modelling for analysis and design tools.
- Demonstrates the ability to understand and to prepare effective reports.
- Conduct presentation on complex computer based problem implementation with the computer based community.
- Ability to give and receive clear instructions.
- Ability to communicate with many people in the practical field.

(ii) Teaching strategies to be used to develop these skills

(iii) Methods of assessment of students numerical and communication skills

- Display all the new software and hardware used in training in the final report.
- Discussion of all the observations related to the technology used in the company in final presentation.

e. Psychomotor Skills (if applicable)

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(i) Description of the psychomotor skills to be developed and the level of performance required
(ii) Teaching strategies to be used to develop these skills
(iii) Methods of assessment of student's psychomotor skills

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Field supervisor report evaluation	Final	40
2	Student report	Final	40
3	Student presentation	Final	20
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

E. Learning Resources

1. Required Text(s)
2. Essential References
3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
4- Electronic Materials, Web Sites etc.
5- Other learning material such as computer-based programs/CD, professional standards/regulations

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
2. Computing resources
3. Other resource

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G. Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department
3. Processes for Improvement of Teaching
4. Processes for Verifying Standards of Student Achievement • The summer training committee may review and reevaluate the students' achievement.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

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ADVANCED WEB PROGRAMMING

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Advanced Web Programming	23165112-3
2. Credit hours:	3	
3. Program(s) in which the course is offered:		Computer Science
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)
5. Level/year at which this course is offered		Elective
6. Pre-requisites for this course (if any)		Internet Applications (23164403-3)
7. Co-requisites for this course (if any)		None
8. Location if not on main campus		Jamoum Campus

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

This module will expand students' knowledge of up-to-the-minute advanced web programming and technologies, concepts of design and development of web sites that are accessible from a myriad of platforms and web browsers combinations, including Windows, Linux/Unix, Macintosh OSX, also including mobile platforms, such as Android, iOS, Windows Phone and Blackberry.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
web programming languages	2	6
web site related problems	1	3
web site tools	2	6
web application programming interfaces	3	9
development frameworks and environments	3	9
web server technologies	2	6
web site deployment	2	6

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

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Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	**0**	**0**	**0**	**0**

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

Knowledge and Understanding:

1. Select the appropriate web technologies to solve a range of web site related problems, using dynamic techniques, such as integrating databases
2. Demonstrate an in depth understanding of the characteristics and limitations of web technologies and the importance of usability in web site tools.
3. Develop, test and deploy web site applications that use web application programming interfaces (APIs) and demonstrate current practice in web site deployment.
4. Evaluate the current professional and ethical issues, in particular those relating to security and privacy of user data, in regards to web sites.

(ii) Teaching strategies to be used to develop that knowledge

5. Lectures, Tutorials, Projects, Discussion.

(iii) Methods of assessment of knowledge acquired

6. Written exams, Assignments, Reports, Project Discussion and Demo, Presentation, Simulation.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

7. Modern, web programming languages will be used in a hands-on laboratory setting, where students will create web sites with multiple features, for example accessibility features and security.

(ii) Teaching strategies to be used to develop these cognitive skills

• Lectures, Tutorials, Projects, Discussion.

(iii) Methods of assessment of student's cognitive skills

• Written exams, Assignments, Reports, Project Discussion and Demo, Presentation, Simulation.

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c. Interpersonal Skills and Responsibility
(i) Description of the interpersonal skills and capacity to carry responsibility to be developed   • None
(ii) Teaching strategies to be used to develop these skills and abilities   • None.
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility   • None.

d. Communication, Information Technology and Numerical Skills
(i) Description of the skills to be developed in this domain.   1. Written, oral and media communication skills   2. Leadership, team working and networking skills   3. Opportunity, creativity and problem solving skills   4. Information technology skills
(ii) Teaching strategies to be used to develop these skills   • Lectures, Tutorials, Projects, Discussion.
(iii) Methods of assessment of students numerical and communication skills   • Written exams, Assignments, Reports, Project Discussion and Demo, Presentation, Simulation.

e. Psychomotor Skills (if applicable)
(i) Description of the psychomotor skills to be developed and the level of performance required   • None.
(ii) Teaching strategies to be used to develop these skills   • None.
(iii) Methods of assessment of student's psychomotor skills   • None.

5. Schedule of Assessment Tasks for Students During the Semester

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No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Class activity	3-16	10
4	Projects	16	10
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)

Jon Duckett, JavaScript & JQuery: Interactive Front-end Web Development, John Wiley & Sons. Jun 2014

2. Essential References

Larry Ullman, PHP and MySQL for Dynamic Web Sites: Visual QuickPro Guide (Visual QuickPro Guides), 4th edition, Peachpit Press. Sep 2011

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- Software: Web Server, Macromedia Product, ….
- OS: Linux/Unix, Macintosh OSX, …

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- Software: Web Server, Macromedia Product, ….
- OS: Linux/Unix, Macintosh OSX, …
- Internet Access.

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3. Other resources
• None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
• Course action plans.

4. Processes for Verifying Standards of Student Achievement
• Student outcomes assessment.

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

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COMPUTER THEORY

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Computer Theory		23165113-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		Elective	
6. Pre-requisites for this course (if any)		Discrete Structures II (23162105-3)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
Upon the completion of this course, the student will have learned, through appropriate classroom lectures, what are the fundamental capabilities and limitations of computers, which problems can or cannot be computed, and how quickly can a problem be computed.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Introduction	2	6
Finite Automata	3	9
Regular Languages	2	6
Context-Free Languages	2	6
Turing Machines	2	6
Complexity	2	6
P and NP Problems	2	6

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

   1. Demonstrate their understanding of key notions, such as algorithm, computability, decidability, and complexity through problem solving.

(ii) Teaching strategies to be used to develop that knowledge

   • Lectures, Tutorials, Discussion.

(iii) Methods of assessment of knowledge acquired

   • Written exams, Assignments.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

   2. Analyze and design finite automata, pushdown automata, Turing machines, formal languages, and grammars.
   3. Prove the basic results of the Theory of Computation.
   4. Explain the relevance of the problem complexity.

(ii) Teaching strategies to be used to develop these cognitive skills

   • Lectures, Tutorials, Discussion.

(iii) Methods of assessment of student's cognitive skills

   • Written exams, Assignments.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

   1. Gain the skills of creative thinking.

(ii) Teaching strategies to be used to develop these skills and abilities

   • Lectures, Tutorials, Discussion.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

   • Written exams, Assignments.

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain

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- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of students numerical and communication skills

- None.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

No	Assessment task	Week due	Proportion of Final Assessment
5. Schedule of Assessment Tasks for Students During the Semester			
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Assignments	1-15	20
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)

- Michael Sipser, Introduction to the Theory of Computation, 3rd Edition, Cengage Learning, 2012..

2. Essential References

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- Elaine Rich, Automata, computability and complexity: theory and applications. Upper Saddle River: Pearson Prentice Hall, 2008.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- None.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- None.

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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PROGRAMMING LANGUAGES

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Programming Languages	23165114-3
2. Credit hours:	3	
3. Program(s) in which the course is offered:	Computer Science	
4. Name of faculty member responsible for the course:	The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered	Elective	
6. Pre-requisites for this course (if any)	Advanced Programming (23164110-4)	
7. Co-requisites for this course (if any)	None	
8. Location if not on main campus	Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

The course aims to let students obtaining an understanding of programming languages, environments, translation, and implementation.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Introduction	1	3
Computer Language History	1	3
Language Design	2	6
Syntax	2	6
Basic Semantics	2	6
Data Types and Memory Management	2	6
Control I: Expressions and Statements	2	6
Control II: Procedures and Environments	2	6
Programming Paradigms: Object-Oriented, Functional & Logic	1	3

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None

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45	0	0	0	0

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

    3-4 hours/week.

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

    1.   Understand the role of certain theoretical formalisms, and apply them in the context of programming languages.

    2.   Identify the differences between programming methodologies.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Tutorials, Projects, Discussion.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments, Reports and Project Discussion.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

    1.   Apply the grammar attributes to specify context-sensitive conditions, compile-time analyses, and translational semantics.

    2.   Define the axiomatic semantics of simple imperative constructs, and using it to prove program properties.

(ii) Teaching strategies to be used to develop these cognitive skills

- Lectures, Tutorials, Projects, Discussion.

(iii) Methods of assessment of student's cognitive skills

- Written exams, Assignments, Reports and Project Discussion.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

(ii) Teaching strategies to be used to develop these skills and abilities

- None.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- None.

d. Communication, Information Technology and Numerical Skills

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(i) Description of the skills to be developed in this domain.

1. Implement parts of simple interpreters and compilers.
2. Explain the operational semantics of programming languages.

(ii) Teaching strategies to be used to develop these skills

- Lectures, Tutorials, Projects, Discussion.

(iii) Methods of assessment of students numerical and communication skills

- Written exams, Assignments, Reports and Project Discussion.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Projects	16	20
5	Final Exam	17-18	40
		Total	100

5. Schedule of Assessment Tasks for Students During the Semester

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- K. Louden, Programming Languages: Principles and Practice, Thompson, 2003.

2. Essential References

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- J. Farrell, Programming Logic and Design – Comprehensive, 6th Edition, Cengage Learning, 2010.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- Internet Access.
- Specialized computer laboratories (max 16 students per session).
  - Free Lab

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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INTRODUCTION TO CRYPTOGRAPHY

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Introduction to Cryptography	23165115-3
2. Credit hours:	3	
3. Program(s) in which the course is offered:		Computer Science
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)
5. Level/year at which this course is offered		Elective
6. Pre-requisites for this course (if any)		Discrete Structures II (23162105-3)
7. Co-requisites for this course (if any)		None
8. Location if not on main campus		Jamoum Campus

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

Upon the completion of cryptography course, the student should be able to:

- learn fundamental of cryptography and its application to network security.
- Understand network security threats, security services, and countermeasures.
- Acquire background knowledge on well-known network security protocols.
- Address open research issues in network security.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Introduction to fundamental principles of cryptography	1	3
Introduction of the fundamental tools in cryptography	1	3
Cryptography and its application to network security.	1	3
Basic key distribution and management mechanisms.	1	3
Security handshake pitfalls and authentications.	2	6
Well known network security protocols such as Kerberos, IPSec, SSL, PGP& PKI, WEP.	3	9
Distributed certification authority and management in wireless networks.	2	6
Various threat models in wireless networks.	2	6

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Energy-aware security protocols and mechanisms for wireless networks.	2	6

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

    3-4 hours/week.

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

The course aims to make the student able to:
1. Apply the knowledge and the skills needed to study further concepts in Information Security.
2. Communicate and interpret ideas related to cryptography in Information Security applications.
3. Understanding random number generation and pseudorandom number.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Projects and Discussion.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments and Project Discussion and Demo.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

At the end of the course, the student will know:
1. How to compare and contrast a range of different cryptosystems from an applied viewpoint.
2. The differences between secret key and public key cryptosystems.
3. How to identify the different approaches to quantifying secrecy.
4. The ability to analyze information systems issues from a number of authentication protocol.
5. Plan strategic information systems.

(ii) Teaching strategies to be used to develop these cognitive skills

- Lectures, Projects and Discussion.

(iii) Methods of assessment of student's cognitive skills

- Written exams, Assignments, Project Discussion and Demo.

c. Interpersonal Skills and Responsibility

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(i) Description of the interpersonal skills and capacity to carry responsibility to be developed	

At the end of the course, the student will be able to:
1. Recognize the different modes of operation for block ciphers and their applications.
2. Understand and apply the role of hash functions in Information Security.
3. Design and undertake independently, a major original research project on a topic which relates to the forefront of the academic discipline of information technology security and reflect extensively and objectively on method, process and outcomes.

(ii) Teaching strategies to be used to develop these skills and abilities

- Lectures, Projects and Discussion.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- Written exams, Assignments, Project Discussion and Demo.

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

Carry out a wide range of principles and tools available to cryptography.

(ii) Teaching strategies to be used to develop these skills

- Lectures, Projects and Discussion.

(iii) Methods of assessment of students numerical and communication skills

- Written exams, Assignments, Project Discussion and Demo.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Projects	16	20

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4	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)

Harold F. Tipton, Micki Krause, "Information Security Management Handbook", CRC Press, ISBN-10: 0849374952, 2007.

2. Essential References

Johannes Buchmann , "Introduction to Cryptography", Springer, ISBN-10: 0387207562, 2004.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- None

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- None

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement

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- Student outcomes assessment.

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

CLOUD COMPUTING

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Cloud Computing	23165204-3
2. Credit hours:	3	
3. Program(s) in which the course is offered:		Computer Science
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)
5. Level/year at which this course is offered		Elective
6. Pre-requisites for this course (if any)		Computer Networks (23163203-4)
7. Co-requisites for this course (if any)		None
8. Location if not on main campus		Jamoum Campus

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

The goal of this course is to introduce the students to the principles, foundations, and applications of cloud computing, and the way it presents significant technology trends to reshape information technology processes and the IT marketplace. In this course the different types of features, standards, services, and security issues in cloud computing will be discussed. This course offers students the opportunity to study this new paradigm of computing in which dynamically scalable and often virtualized resources are offered as services over the internet. The course will also cover some of the autonomic computing aspects which provide solutions to the challenges of cloud management.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Overview of Distributed Computing: Trends of computing, Introduction to distributed computing.	1	3
Introduction to Cloud Computing: What's cloud computing, Properties & Characteristics, Service models, Deployment models.	2	6
Infrastructure as a Service (IaaS): Introduction to IaaS, Resource Virtualization, Server, Storage, Network, Case studies.	2	6

Platform as a Service (PaaS): Introduction to PaaS, Cloud platform & Management, Computation, Storage, Case studies.	2	6
Software as a Service (SaaS): Introduction to SaaS, Web services Web 2.0, Web OS, Case studies	2	6
Cloud issues and challenges: Cloud provider Lock-in, Security.	2	6
Introduction to Hadoop: Typical Hadoop Cluster, Challenges, Hadoop Components, example.	1	3
Hadoop Distributed File System: Big data and hand hop introduction, Hdfs introduction, Hdfs definition, Hfds architecture, understanding the file system, Read and write in Hdfs.	3	9

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	**0**	**0**	**0**	**0**

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

1. Demonstrate the knowledge of architecture, service models, economics, scaling and recovering of cloud computing.
2. Understand the core concepts of the cloud computing paradigm: how and why this paradigm shift came about and the influence of several enabling technologies in cloud computing.
3. Understand the technology infrastructure and network requirements for cloud computing.
4. Understand the legal, ethical, and managerial requirements of cloud computing.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Case study, and Self-study.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments, Reports, and Presentation.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

1. Choose the appropriate technologies, algorithms, and approaches for the related issues.
2. Use the appropriate cloud computing solutions and recommendations according to the applications used.

(ii) Teaching strategies to be used to develop these cognitive skills

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- Lectures, Case study, and Self-study.

(iii) Methods of assessment of student's cognitive skills

- Written exams, Assignments, and Reports.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

1. Learn how to search for information through library and internet.
2. Present a short report in a written form and orally using appropriate scientific language.

(ii) Teaching strategies to be used to develop these skills and abilities

- Research, Self-study, and Discussion.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- Reports, and Presentation.

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of students numerical and communication skills

- None.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment

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1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Homework	3-10	10
4	Term Paper and Presentation	16	10
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- Ray J Rafaels, Cloud Computing: From Beginning to End, CreateSpace Independent Publishing Platform, April 1, 2015.

2. Essential References
- John Rhoton, Cloud Computing Explained: Implementation Handbook for Enterprises, Recursive Press, 2009.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- None.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- Internet Access.

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

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3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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DATABASE II

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Database II		23165306-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science Information Systems	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		Elective	
6. Pre-requisites for this course (if any)		Database I (23163302-3)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

This course provides advanced database knowledge. It presents the basics of transactions, data mining and warehousing, query processing and optimization, database tuning, distributed and NoSQL databases.

- Design and execute advanced queries.
- Design application using EER model.
- Describe components of database management systems.
- Explain how queries are processed and simple query optimization techniques.
- Define concepts like transaction processing, backup and recovery.
- Understand advanced data modelling e.g. object oriented, distributed database, XML, data warehousing and data mining and the supporting theoretical foundation.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Advanced SQL: NULL values, Semi join, left join, right join, triggers and views	2	6
Enhanced Entity-Relationship (EER) Model	1	3
Transactions: failures, atomicity, consistency, isolation, durability	2	6
Query Processing and Query Optimization Techniques	2	6

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Database Backup and Recovery	1	3
Object and Object-Relational Databases	2	6
XML for Semi-structured Data	1	3
Distributed Database (DDB)	1	3
Database Security	1	3
NoSQL Databases	1	3
Data mining and Warehousing	1	3

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

   7.   Understand advanced features of SQL.
   8.   Understand query processing and different optimization techniques.
   9.   Understand the concepts of constraints and relational algebra operations.
   10. Implement advanced features of SQL
   11. Understand principles of distributed database, data mining and data warehousing.

(ii) Teaching strategies to be used to develop that knowledge

   •   Lectures, Tutorials, Discussion, Case Study.

(iii) Methods of assessment of knowledge acquired

   •   Written exams, Assignments.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

•   Understand the concepts of data modeling and database design

(ii) Teaching strategies to be used to develop these cognitive skills

   •   Lectures, Tutorials, Discussion.

(iii) Methods of assessment of student's cognitive skills

   •   Written exams, Assignments.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

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- None.

(ii) Teaching strategies to be used to develop these skills and abilities

- None.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- None.

d.   Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of students numerical and communication skills

- None.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

No	Assessment task	Week due	Proportion of Final Assessment
**5. Schedule of Assessment Tasks for Students During the Semester**			
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Projects	16	20
4	Final Exam	17-18	40
		Total	100

D. Student Support

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1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- R. Elmasri and S.B. Navathe, Fundamentals of Database Systems, Addison-Wesley, 6th Edition, 2011.

2. Essential References
- T.M. Connolly, C. Begg and A.D. Stroahn, Database Systems: A practical to design, implementation and management, Course Technology, 10th Edition, 2012.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- None.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- MySQL Server and MySQL Workbench.

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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SOFTWARE TESTING

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Software Testing	23165307-3
2. Credit hours:	3	

3. Program(s) in which the course is offered:	Computer Science Information Systems
4. Name of faculty member responsible for the course:	The Course Coordinator (Assigned by Curriculum Committee)
5. Level/year at which this course is offered	Elective
6. Pre-requisites for this course (if any)	Software Engineering II (23164304-3)
7. Co-requisites for this course (if any)	None
8. Location if not on main campus	Jamoum Campus

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

Introduction to software testing principles and practice as used in industry. Discusses practical software testing goals and approaches to testing software through all phases of the SDLC. Software quality assurance will be discussed as part of a dynamic process that is flexible and constantly turned to the changing needs of a project.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Fundamentals of Testing	1	3
Testing Throughout the Software Life Cycle	1	3
Static Techniques	2	6
Specification-based or black-box techniques	3	9
Quality Characteristics for Technical Testing	3	9
Test Management	2	6
Test Tools an Automation	2	6

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
42	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Tutorials, Assignments,

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

- None.

(ii) Teaching strategies to be used to develop these cognitive skills

- None.

(iii) Methods of assessment of student's cognitive skills

- None.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

- None.

(ii) Teaching strategies to be used to develop these skills and abilities

- None.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- None.

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

• None.	
(ii) Teaching strategies to be used to develop these skills	
• None.	
(iii) Methods of assessment of students numerical and communication skills	
• None.	

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required
• None.
(ii) Teaching strategies to be used to develop these skills
• None.
(iii) Methods of assessment of student's psychomotor skills
• None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
4	Assignment	16	20
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)

- Glenford, Myers & Corey Sandler, Tom Badgett; "The Art of Software Testing", 3rd Edition, John Wiley & Sons, 2011.

2. Essential References

- Paul Ammann, Jeff Offutt, "Introduction to Software Testing", Cambridge University Press, 2008.

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3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
• None.
4- Electronic Materials, Web Sites etc.
• UQU e-learning portal.
5- Other learning material such as computer-based programs/CD, professional standards/regulations
• None.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
• Classroom with 35 seats for students.
2. Computing resources
• None.
3. Other resources
• None.

G. Course Evaluation and Improvement Processes

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

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SOFTWARE ARCHITECTURE
NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Software Architecture		23165308-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		Elective	
6. Pre-requisites for this course (if any)		Software Engineering II (23164304-3)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
The goal of this course is to get the student to become more familiar with the differ software architecture and to gain the knowhow on using these architectures.

- Student will learn the concept of virtual software bus.
- Student will learn the concepts of CORBA and how to use it.
- Student will learn the concepts of RMI/Java and will gain hand on experience on how to program RMI applications.
- Student will learn the concepts of SOA, web services and will gain hand on experience on how to program use it.
- Student will learn the concepts of OAuth, trust, security and how to implement OAuth application.
- Web-based attacks (SQL injections, session stealing, etc.…) and how to protect your application.
- Student will learn how to store login information on the client machine using temporary tokens.

2. Briefly describe 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

1. Topics to be Covered

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List of Topics	No of Weeks	Contact hours
Virtual bus concept	1	3
CORBA concepts and implementation	2	6
RMI/Java	1	3
SOA and Web services	2	6
OAuth concepts and implementation	2	6
Multi-tier web applications and web framework (such as Spring)	2	6
Web-base attacks (SQL injections, session stealing, etc.) and how to protect you application	4	12
Storing login information on the client machine using tokens	2	3

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

Knowledge and Understanding:

- Get the students to become more familiar with different software architecture and to gain the knowhow on using these archititrures.
- Learn the concept of virtual software bus architectures suc as CORBA, RMI, and SOA and how to use them.
- Learn the concept of OAuth, trust, security and how to implement OAuth application.
- Learn web-base attacks (SQL injections, session stealing, etc.) and how to protect your application,

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Tutorials, Projects, Discussion.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments, Reports, Project Discussion and Demo, Presentation, Simulation.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

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(ii) Teaching strategies to be used to develop these cognitive skills
• Lectures, Tutorials, Projects, Discussion.
(iii) Methods of assessment of student's cognitive skills
• Written exams, Assignments, Reports, Project Discussion and Demo, Presentation, Simulation.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed
• None
(ii) Teaching strategies to be used to develop these skills and abilities
• None.
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility
• None.

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.
1. Written, oral and media communication skills
2. Leadership, team working and networking skills
3. Opportunity, creativity and problem solving skills
4. Information technology skills
(ii) Teaching strategies to be used to develop these skills
• Lectures, Tutorials, Projects, Discussion.
(iii) Methods of assessment of students numerical and communication skills
• Written exams, Assignments, Reports, Project Discussion and Demo, Presentation, Simulation.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required
• None.
(ii) Teaching strategies to be used to develop these skills
• None.

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(iii) Methods of assessment of student's psychomotor skills

- None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Class activity	3-16	10
4	Projects	16	10
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)

- Java RMI,1st Edition, William Grosso, O'Reilly, ISBN-10: 1565924525
- SOA with Java: Realizing Service-Oriented with Java Technologies, 1st Edition, Thomas Erl, Andre Tost, Satardu Roy, Philip Thomas, Raj Balasubramanian, David Chou, Thomas Plunkett, Prentice Hall, ISBN-10: 0133859037
- Getting Started with OAuth 2.0, 1st Edition, Ryan Boyd, O'Reilly, ISBN-10: 1449311601
- Web Security Testing Cookbook: Systematic Techniques to Find Problems Fast, 1st Edition, Paco Hope, Ben Walther, O'Reilly, ISBN-10: 0596514832

2. Essential References

Larry Ullman, PHP and MySQL for Dynamic Web Sites: Visual QuickPro Guide (Visual QuickPro Guides), 4th edition, Peachpit Press. Sep 2011

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations

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F. Facilities Required

1. **Accommodation (Lecture rooms, laboratories, etc.)**
• Classroom with 35 seats for students.

2. **Computing resources**

3. **Other resources**
• None.

G. Course Evaluation and Improvement Processes

1. **Strategies for Obtaining Student Feedback on Effectiveness of Teaching**
• Course evaluation surveys.

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

3. **Processes for Improvement of Teaching**
• Course action plans.

4. **Processes for Verifying Standards of Student Achievement**
• Student outcomes assessment.

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

COMPUTERS & SOCIETY

NCAAA Course Specification

Institution:	**Umm Al-Qura University**
College	**Jamoum University College**
Department	**Computers**

A. Course Identification and General Information

1. Course title and code:	Computers & Society	23165405-2
2. Credit hours:	2	
3. Program(s) in which the course is offered:		Computer Science Information Systems
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)
5. Level/year at which this course is offered		9/5
6. Pre-requisites for this course (if any)		Software Engineering I (23164303-3)

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7. Co-requisites for this course (if any)	None
8. Location if not on main campus	Jamoum Campus

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
Upon completing this course, the student will have learned the following topics: Historical Background, Communications and Internet, Computers in Education, Computer Ethics, Computer Privacy, Computer Security, Software Piracy, Computer in Aviation, Computer Crimes, and Popular Social Network Sites.

2. Briefly describe 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

1. Topics to be Covered		
List of Topics	No of Weeks	Contact hours
Introduction and Historical Background	2	6
Communications and Internet	2	6
Computer Ethics	1	3
Computer Privacy	1	3
Computer Crimes	2	6
Software Piracy	2	6
Computer Security	3	9
Social Media Network	2	6

2. Course components (total contact hours per semester):				
Lecture	**Tutorial**	**Laboratory**	**Practical/Field work/Internship**	**Other: None**
45	**0**	**0**	**0**	**0**

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

4. Development of Learning Outcomes in Domains of Learning
a. Knowledge
(i) Description of the knowledge to be acquired
1. Understand professional, ethical, legal, security and social issues and responsibilities.
(ii) Teaching strategies to be used to develop that knowledge
• Lectures, Case study, Self-study, and Discussion.

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(iii) Methods of assessment of knowledge acquired

- Written exams, Reports, and Presentation.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

1. Analyze the local and global impact of computing on individuals, organizations, and society;
2. Recognize the need, and engage in, continuing professional development.

(ii) Teaching strategies to be used to develop these cognitive skills

- Lectures, Case study, Self-study, and Discussion.

(iii) Methods of assessment of student's cognitive skills

- Written exams, Reports, and Presentation.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

- None.

(ii) Teaching strategies to be used to develop these skills and abilities

- None.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- None.

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

1. Communicate effectively with a range of audiences.

(ii) Teaching strategies to be used to develop these skills

- Lectures, Case study, Research, Self-study, and Discussion.

(iii) Methods of assessment of students numerical and communication skills

- Written exams, Reports, and Presentation.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

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(iii) Methods of assessment of student's psychomotor skills

- None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Class Activities	16	10
4	Report & Presentation	16	10
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- M. David Ermann and Michele S. Shauf. Computer, Ethics, and Society, 3rd Edition, Oxford University Press, 2002.

2. Essential References
- Giannis Stamatellos. Computer ethics: A global perspective. Jones and Bartlett Publishers, 2007.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- None.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- Internet Access.

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3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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MOBILE APPLICATIONS

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Mobile Applications	23165406-3
2. Credit hours:	3	
3. Program(s) in which the course is offered:		Computer Science
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)
5. Level/year at which this course is offered		Elective
6. Pre-requisites for this course (if any)		Database II (23165306-3) Internet Applications (23164403-3)
7. Co-requisites for this course (if any)		None
8. Location if not on main campus		Jamoum Campus

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

By completing this course the students should be able to:

1. Use the Java Programming skills to design and implement a complete mobile application for the Android platform.
2. Use built-in sensors, messaging, local database access and networking features to handle advanced mobile applications.
3. Publish Android applications to the cloud.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Introduction to mobile applications programming	1	3
Basics of Android framework	1	3
Building first Android application in Eclipse	1	3
Activities and intents	1	3
Getting to know the Android User Interface	1	3
Designing User Interface using Views	1	3
Displaying pictures and menus with Views	1	3
Data Persistence and SQLite Database Programming	2	6

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Accessing built-in Sensors and Data Storage	2	6
Messaging and Networking	2	6
Publishing Android Applications	2	6

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

This course teaches students how to design, implement, test, debug and publish mobile applications. Topics include development environment, phone emulator, and key programming paradigms. UI design including views and activities, data persistence, messaging and networking, embedded sensors, location based services, cloud programming, and publishing applications. Concepts are reinforced through a set of weekly programming assignments and group projects.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Tutorials, Practical sessions, Projects.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments, Practical exams, Reports, Project Discussion.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

(ii) Teaching strategies to be used to develop these cognitive skills

- None.

(iii) Methods of assessment of student's cognitive skills

- None.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

(ii) Teaching strategies to be used to develop these skills and abilities

- None.

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(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility
• None.
d.   Communication, Information Technology and Numerical Skills
(i) Description of the skills to be developed in this domain.
(ii) Teaching strategies to be used to develop these skills
• None.
(iii) Methods of assessment of students numerical and communication skills
• None.
e. Psychomotor Skills (if applicable)
(i) Description of the psychomotor skills to be developed and the level of performance required
• None.
(ii) Teaching strategies to be used to develop these skills
• None.
(iii) Methods of assessment of student's psychomotor skills
• None.

5. Schedule of Assessment Tasks for Students During the Semester			
No	**Assessment task**	**Week due**	**Proportion of Final Assessment**
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
4	Projects	16	20
5	Final Exam	17-18	40
		Total	100

D. Student Support

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

E. Learning Resources

1. Required Text(s)

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- Beginning Android Application Development, Wrox, by Wei-Meng; ISBN: 978-1180-1711-1, April 2011.

2. Essential References
- The Busy Coder's Guide to Android Development, Mark L. Murphy, CommonsWare, LLC, 2014.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.
- General computer laboratories (max 20 students per session).

2. Computing resources
- Software: Emulators for mobile applications, Mobile applications development tools.
- Internet Access.
- Specialized computer laboratories (max 16 students per session).
  - Free Lab

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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BIG DATA ANALYTICS

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Big Data Analytics		23165407-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science Information Systems	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		Elective	
6. Pre-requisites for this course (if any)		Database II (23165306-3)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

The course is designed to equip students with specialist computing skills which focus on knowledge discovery from structured and unstructured big data stores. The course will provide research and technical skills necessary for the student to develop sophisticated data analysis and retrieval systems applied to big.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Data warehousing	3	9
Advanced databases for big data	3	9
Big data programming	3	9
Big data analysis	3	9
Data mining	3	9

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired
  1. Provide the opportunity to upgrade existing skills to the state-of-the-art in areas data mining, programming for distributed processing systems, advanced databases, data analytics techniques and leveraging cloud computing platforms for big data analytics.

(ii) Teaching strategies to be used to develop that knowledge
  • Lectures, Projects, Research, Discussion, Workshops.

(iii) Methods of assessment of knowledge acquired
  • Written exams, Assignments, Reports, Project Discussion and Demo, Presentation.

b. Cognitive Skills

(i) Description of cognitive skills to be developed
  1. Training students in big data technology and methods.

(ii) Teaching strategies to be used to develop these cognitive skills
  • Projects, Research, Discussion, Workshops.

(iii) Methods of assessment of student's cognitive skills
  • Reports, Project Discussion and Demo, Presentation.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed
  • None.

(ii) Teaching strategies to be used to develop these skills and abilities
  • None.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility
  • None.

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.
  • None.

(ii) Teaching strategies to be used to develop these skills
  • None.

(iii) Methods of assessment of students numerical and communication skills
  • None.

e. Psychomotor Skills (if applicable)

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(i) Description of the psychomotor skills to be developed and the level of performance required
- None.

(ii) Teaching strategies to be used to develop these skills
- None.

(iii) Methods of assessment of student's psychomotor skills
- None.

No	Assessment task	Week due	Proportion of Final Assessment
	5. Schedule of Assessment Tasks for Students During the Semester		
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Projects	16	20
4	Final Exam	17-18	40
		Total	100

D. Student Support

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

E. Learning Resources

1. Required Text(s)
- T. Erl, W. Khattak and P. Buhler, Big Data Fundamentals: Concepts, Drivers & Techniques, Prentice Hall, 1st edition (2016).

2. Essential References
- None.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- None.

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- None.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

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2. Computing resources
- Internet Access.
- Specialized computer laboratories (max 16 students per session).
  o Free Lab

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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NEURAL NETWORKS

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Neural Networks		23165408-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		Elective	
6. Pre-requisites for this course (if any)		Artificial Intelligence (23164402-4)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

By the end of this course, the student should be capable of:

1. Understand basic neural network architectures and their applications.
2. Understand learning algorithms and how to apply them.
3. Apply neural networks to solve practical problems.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Introduction to neural networks	2	6
Math concepts needed for neural networks	2	6
Supervised neural networks and learning algorithms	4	12
Recurrent neural networks	2	6
Unsupervised neural networks	3	9
Reinforcement neural networks	2	6

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning
a. Knowledge
(i) Description of the knowledge to be acquired
1. Explain the function of different types of neural networks.
2. Explain the difference between different types of neural networks.
3. Design and implementation for a simple real-life problem.
(ii) Teaching strategies to be used to develop that knowledge
• Lectures, Tutorials, Practical sessions, Projects.
(iii) Methods of assessment of knowledge acquired
• Written exams, Assignments, Practical exams, Simulation.
b. Cognitive Skills
(i) Description of cognitive skills to be developed
1. Use appropriate simulations and hardware to demonstrate the applications of neural networks
(ii) Teaching strategies to be used to develop these cognitive skills
• Lectures, Tutorials, Practical sessions, Projects.
(iii) Methods of assessment of student's cognitive skills
• Written exams, Assignments, Practical exams, Simulation.
c. Interpersonal Skills and Responsibility
(i) Description of the interpersonal skills and capacity to carry responsibility to be developed
• None
(ii) Teaching strategies to be used to develop these skills and abilities
• None
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility
• None
d. Communication, Information Technology and Numerical Skills
(i) Description of the skills to be developed in this domain.

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(ii) Teaching strategies to be used to develop these skills

- Lectures, Tutorials, Practical sessions, Projects, Case study, Research, Self-study, Discussion, Workshops, Role playing.

(iii) Methods of assessment of students numerical and communication skills

- Written exams, Assignments, Oral exams, Practical exams, Reports, Project Discussion and Demo, Presentation, Posters, Simulation.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

No	Assessment task	Week due	Proportion of Final Assessment
**5. Schedule of Assessment Tasks for Students During the Semester**
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Projects	16	20
4	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- S. Haykin, neural Networks: A Comprehensive Foundation, 2nd Ed. 1999.

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2. Essential References
- None.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- Software: Matlab or Ocatve

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.
- General computer laboratories (max 20 students per session).

2. Computing resources
- Software: Matlab or Octave
- Internet Access.
- Specialized computer laboratories (max 16 students per session).
  - AI Lab
  - Free Lab

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

NATURAL LANGUAGE PROCESSING

NCAAA Course Specification

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Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Natural Language Processing		23165409-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		Elective	
6. Pre-requisites for this course (if any)		Artificial Intelligence (23164402-4)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

Upon the completion of this course, the student will have learned, through appropriate classroom lectures and projects, the fundamental algorithms and models for Natural Language Processing (NLP), how you can use them to solve practical problems in dealing with language data wherever you encounter it.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Introduction	1	3
Finite-state methods for NLP	3	9
Morphology	3	9
Word prediction	2	6
Language modeling	2	6
Parts of speech	1	3
Speech Synthesis	1	3
Automatic Speech Recognition	1	3
Project Defense	1	3

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

   1. Understand lexical, syntactic, semantic and pragmatic aspects of NLP.

   2. Learn the algorithms and methods on the Natural Language Processing domain.

   3. Understand basic concepts in Arabic language processing.

(ii) Teaching strategies to be used to develop that knowledge

   • Lectures, Discussion.

(iii) Methods of assessment of knowledge acquired

   • Written exams, Assignments.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

   1. Associate statistical and machine learning approaches to NLP.

   2. Acquire the skills for developing NLP tools/systems.

(ii) Teaching strategies to be used to develop these cognitive skills

   • Lectures, Case study, Discussion.

(iii) Methods of assessment of student's cognitive skills

   • Written exams, Assignments, Project Discussion.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

   1. Demonstrate the ability to work effectively in teams.

(ii) Teaching strategies to be used to develop these skills and abilities

   • Projects.

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(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- Project Discussion.

d.   Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

  2. Demonstrate efficient programming skills using a proper programming language.

(ii) Teaching strategies to be used to develop these skills

- Projects.

(iii) Methods of assessment of students numerical and communication skills

- Project Discussion.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
4	Projects	16	20
5	Final Exam	17-18	40
		Total	100

5. Schedule of Assessment Tasks for Students During the Semester

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

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E. Learning Resources

1. Required Text(s)
• Daniel Jurafsky and James H. Martin. Speech and Language Processing: An introduction to natural language processing, Pearson Prentice Hall, 2nd Edition (May 26, 2008).
2. Essential References
• Anne Kao and Steve R. Poteet. Natural language processing and text mining. Springer, 2007.
3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
• **None.**
4- Electronic Materials, Web Sites etc.
• UQU e-learning portal.
5- Other learning material such as computer-based programs/CD, professional standards/regulations
• Software: compiler of a language selected by the student.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
• Classroom with 35 seats for students.
2. Computing resources
• Software: compiler of a language selected by the student.   • Internet Access.   • Specialized computer laboratories (max 16 students per session).   o Free Lab
3. Other resources
• None.

G. Course Evaluation and Improvement Processes

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

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IMAGE PROCESSING

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Image Processing	23165410-3
2. Credit hours:		
3. Program(s) in which the course is offered:	Computer Science	
4. Name of faculty member responsible for the course:	The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered	Elective	
6. Pre-requisites for this course (if any)	Algorithms (23163108-4) Computer Graphics (23163401-3)	
7. Co-requisites for this course (if any)	None	
8. Location if not on main campus	Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

The course is designed to introduce students to advanced theoretical concepts and practical issues associated with image processing. A special effort will be made to develop students' problem solving skills. New concepts are integrated with students' previous experience through use of systems theory.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Image Representation	2	6
Image Enhancement	2	6
Spectral Techniques	2	6
Filtering and Smoothing	2	6
Segmentation and Feature Extraction	3	9
Geometric Transformation	2	6
Image Compression	2	6

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None

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45	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning
a. Knowledge
(i) Description of the knowledge to be acquired 1. Understand the concepts of image processing techniques. 2. Explain the advanced textbooks and research literature in the subject area.
(ii) Teaching strategies to be used to develop that knowledge • Lectures, Tutorials.
(iii) Methods of assessment of knowledge acquired • Written exams, Assignments.
b. Cognitive Skills
(i) Description of cognitive skills to be developed 2. Solve a wide range of problems related to various image processing techniques. 3. Create solutions of problems, develop designs, and be aware of the context of computer developments.
(ii) Teaching strategies to be used to develop these cognitive skills • Lectures, Tutorials, Projects.
(iii) Methods of assessment of student's cognitive skills • Written exams, Assignments, Project Discussion.
c. Interpersonal Skills and Responsibility
(i) Description of the interpersonal skills and capacity to carry responsibility to be developed Demonstrate the ability to work effectively in teams.
(ii) Teaching strategies to be used to develop these skills and abilities • Projects.
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility • Project Discussion. •
d. Communication, Information Technology and Numerical Skills

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(i) Description of the skills to be developed in this domain.

1. Carry out a wide range of principles and tools available to the image processing.

(ii) Teaching strategies to be used to develop these skills

- Projects.

(iii) Methods of assessment of students numerical and communication skills

- Project Discussion.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
4	Projects	16	20
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- Gonzalez, Rafael C., and Richard E. Woods. "Digital image processing." Latest edition.

2. Essential References

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• Marques, Oge. *Practical image and video processing using MATLAB*. John Wiley & Sons, 2011.
3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List) • **None.**
4- Electronic Materials, Web Sites etc. • UQU e-learning portal.
5- Other learning material such as computer-based programs/CD, professional standards/regulations • Matlab /Octave

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.) • Classroom with 35 seats for students.
2. Computing resources • Software: Matlab /Octave • Internet Access. • Specialized computer laboratories (max 16 students per session).   o Free Lab
3. Other resources • None.

G. Course Evaluation and Improvement Processes

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

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PATTERN RECOGNITION
NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Pattern Recognition	23165411-3
2. Credit hours:	3	
3. Program(s) in which the course is offered:		Computer Science
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)
5. Level/year at which this course is offered		Elective
6. Pre-requisites for this course (if any)		Computer Graphics (23163401-3) Artificial Intelligence (23164402-4)
7. Co-requisites for this course (if any)		None
8. Location if not on main campus		Jamoum Campus

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

The aim of this course is study pattern recognition techniques. These techniques include statistical methodologies, e.g. Bayesian Decision Theory, clustering techniques, e.g. k-means, classifiers, e.g. SVM, Parameter estimation, graphical models, MRF, and sequential pattern recognition.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Statistical Analysis	3	9
Clustering	2	6
Classification	4	12
Parameter Estimation	2	6
Graphical Models	2	6
Sequential Pattern Recognition	2	6

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning
a. Knowledge
(i) Description of the knowledge to be acquired
3. Understand the concepts of pattern recognition techniques.
4. Explain the advanced textbooks and research literature in the subject area.
(ii) Teaching strategies to be used to develop that knowledge
• Lectures, Tutorials.
(iii) Methods of assessment of knowledge acquired
• Written exams, Assignments.
b. Cognitive Skills
(i) Description of cognitive skills to be developed
1. Solve a wide range of problems related to various pattern recognition techniques.
2. Create solutions of problems, develop designs, and be aware of the context of computer developments.
(ii) Teaching strategies to be used to develop these cognitive skills
• Lectures, Tutorials, Projects.
(iii) Methods of assessment of student's cognitive skills
• Written exams, Assignments, Project Discussion.
c. Interpersonal Skills and Responsibility
(i) Description of the interpersonal skills and capacity to carry responsibility to be developed
Demonstrate the ability to work effectively in teams.
(ii) Teaching strategies to be used to develop these skills and abilities
• Projects.
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility
• Project Discussion.
•
d. Communication, Information Technology and Numerical Skills
(i) Description of the skills to be developed in this domain.

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2. Carry out a wide range of principles and tools available to the pattern recognition.

(ii) Teaching strategies to be used to develop these skills
• Projects.

(iii) Methods of assessment of students numerical and communication skills
• Project Discussion.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required
• None.

(ii) Teaching strategies to be used to develop these skills
• None.

(iii) Methods of assessment of student's psychomotor skills
• None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
4	Projects	16	20
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- Bishop, C. "Pattern Recognition and Machine Learning" (Latest Edition).

2. Essential References

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- Theodoridis, Sergios, and Konstantinos Koutroumbas. "Pattern Recognition" (Latest Edition).

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- Matlab /Octave

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- Software: Matlab /Octave
- Internet Access.
- Specialized computer laboratories (max 16 students per session).
  - Free Lab

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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GAME PROGRAMMING
NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Game Programming		23165412-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		Elective	
6. Pre-requisites for this course (if any)		Computer Graphics (23163401-3) Artificial Intelligence (23164402-4)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
The module will cover game programming and game engine design. A fully featured game programming will be developed from first principles. Core technologies for modern game engine design will be covered, including: 3-D graphics, rendering and camera techniques, lighting and material theory, collision detection, particle systems, physics simulation, non-player character AI, and game logic.

2. Briefly describe 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

1. Topics to be Covered		
List of Topics	No of Weeks	Contact hours
Introduction to game programming	2	6
Game engine architecture 3-D graphics	1	3
Game Mechanisms	1	3
Rendering and camera techniques	2	6
Lighting and material theory	2	6
Collision detection	2	6
Physics simulation	2	6
Advanced game AI	3	9

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

    3-4 hours/week.

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

Students will be required to use the skills learned in completing these tasks to implement a playable game demo exhibiting advanced properties of several of the components above, and document the demo to provide a rationale for their design decisions in the context of theory

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Tutorials, Projects, Discussion.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments, Reports, Project Discussion and Demo, Presentation, Simulation.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

(ii) Teaching strategies to be used to develop these cognitive skills

- Lectures, Tutorials, Projects, Discussion.

(iii) Methods of assessment of student's cognitive skills

- Written exams, Assignments, Reports, Project Discussion and Demo, Presentation, Simulation.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

- None

(ii) Teaching strategies to be used to develop these skills and abilities

- None

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(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- None

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

- Define and implement 3-D game worlds
- Implement physical simulations in game worlds
- Implement a game AI system for NPC behavior
- Design and implement a collision detection system

(ii) Teaching strategies to be used to develop these skills

- Lectures, Tutorials, Projects, Discussion.

(iii) Methods of assessment of students numerical and communication skills

- Written exams, Assignments, Reports, Project Discussion and Demo, Presentation, Simulation.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

No	Assessment task	Week due	Proportion of Final Assessment
**5. Schedule of Assessment Tasks for Students During the Semester**
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Class Activity	3-16	10
4	Projects	16	10
5	Final Exam	17-18	40
		Total	100

D. Student Support

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1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)

McShaffry, M. 'Game Coding Complete, 4th Edition', Delmar, 2012.

2. Essential References

Benstead, L. 'Beginning OpenGL Game Programming' 2nd Edition, Delmar, 2009.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- Software: Microsoft visual studio, BGI, OpenGl….

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- Software: Microsoft visual studio, BGI, OpenGl….
- Internet Access.
- Specialized computer laboratories (max 16 students per session).
  - o AI Lab
  - o HW Lab

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement

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- Student outcomes assessment.

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

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FORENSICS COMPUTING

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Forensics Computing	23165413-3
2. Credit hours:	3	
3. Program(s) in which the course is offered:		Computer Science
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)
5. Level/year at which this course is offered		Elective
6. Pre-requisites for this course (if any)		Computer Security (23164404-3)
7. Co-requisites for this course (if any)		None
8. Location if not on main campus		Jamoum Campus

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
This course aims to develop students with Computer Forensics skills; which involves the analysis and interpretation of digital evidence from computers and associated devices. Computer forensics encompasses Forensic Science, through the evidential processing and analysis of exhibits, and computing, to develop an understanding of computers and their functioning.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Introduction to Computer Forensics	1	3
Data Acquisition	1	3
Current Computer Forensics Tools	2	6
Processing Crime Scenes and Digital Evidence Controls	2	6
Recovering Image Files	2	6
Computer Forensics Analysis	2	6
Cloud and Network Forensics	2	6

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| E-mail and Social Media Investigation | 3 | 6 |
| Reporting Investigation Results | 1 | 3 |

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

    3-4 hours/week.

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

    1. Understand key aspects of computer forensics, including acquisition of coherent and detailed knowledge, at least some of which is at, or informed by, the forefront of the discipline

    2. Acquire the ability to deploy accurately established techniques of analysis and design that encompass internationally recognized standards.

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Tutorials.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

    1. Devise and sustain arguments and solve problems using ideas and techniques, some of which are at the forefront of Computer Forensics practice, and describe and comment upon particular aspects of current research, or equivalent advanced scholarship

(ii) Teaching strategies to be used to develop these cognitive skills

- Lectures, Tutorials, Discussion.

(iii) Methods of assessment of student's cognitive skills

- Written exams, Assignments, Presentation.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

    1. Undertake projects to a professional industry recognized standards, within Computer Forensics, by the consistent application and review of development, management and evaluation of methods and techniques.

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(ii) Teaching strategies to be used to develop these skills and abilities

- Case study, Discussion.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- Presentation.

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

1. Undertake research and critically evaluate arguments, assumptions, abstract concepts and data (that may be incomplete), to make judgments, and to frame appropriate questions to achieve a solution or identify a range of solutions to a problem.

(ii) Teaching strategies to be used to develop these skills and abilities

- Case study, Discussion.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

- Presentation.

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

No	Assessment task	Week due	Proportion of Final Assessment
**5. Schedule of Assessment Tasks for Students During the Semester**			
1	Midterm Exam 1	5-7	30
2	Midterm Exam 2	12-13	30
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- Nelson, Bill, Amelia Phillips, and Christopher Steuart. *Guide to computer forensics and investigations.* Cengage Learning, 2014.

2. Essential References
- Casey, Eoghan. Digital evidence and computer crime: Forensic science, computers, and the internet. Academic press, 2011.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- None

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- Internet Access.

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement
- Student outcomes assessment.

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

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BIOINFORMATICS

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Bioinformatics		23165414-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		Elective	
6. Pre-requisites for this course (if any)		Algorithms (23163108-4)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
This course focuses on developing and applying computationally intensive techniques (e.g., data mining, and machine learning algorithms) to biological problems. This let the student to deploy his knowledge of databases, algorithms, computational and statistical techniques, and theory to solve formal and practical problems arising from the management and analysis of biological data.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Introduction	1	3
Molecular Biology Primer	3	9
Sequence Alignment Algorithms	2	6
Motif Discovery & Gene Prediction	2	6
DNA Sequencing	2	6
Pattern Matching	1	3
Gene Expression Analysis	1	3
Bioinformatics Databases	3	9

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

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Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	**0**	**0**	**0**	**0**

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

   1. Knowledge of a range of bioinformatic concepts, tools and techniques and understand the principles behind these techniques.

(ii) Teaching strategies to be used to develop that knowledge

   • Lectures, Projects, Research, Self-study, Discussion, Workshops.

(iii) Methods of assessment of knowledge acquired

   • Written exams, Reports, Project Discussion and Demo, Presentation.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

   1. Specify, test and replicate computational solutions in the analysis of biological data.
   2. Apply the essential computing techniques to solve biological problems.

(ii) Teaching strategies to be used to develop these cognitive skills

   • Lectures, Projects, Research, Self-study, Discussion, Workshops.

(iii) Methods of assessment of student's cognitive skills

   • Written exams, Reports, Project Discussion and Demo, Presentation.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

   1. Manage their own learning and to conduct independent and effective study.

(ii) Teaching strategies to be used to develop these skills and abilities

   • Projects, Research, Self-study, Discussion, Workshops.

(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility

   • Reports, Project Discussion and Demo, Presentation.

d. Communication, Information Technology and Numerical Skills

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(i) Description of the skills to be developed in this domain.		
2. An ability to communicate effectively with a range of audiences and within a project team.		
(ii) Teaching strategies to be used to develop these skills		
• Projects, Research, Discussion, Workshops.		
(iii) Methods of assessment of students numerical and communication skills		
• Reports, Project Discussion and Demo, Presentation.		

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required
• None.
(ii) Teaching strategies to be used to develop these skills
• None.
(iii) Methods of assessment of student's psychomotor skills
• None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Projects	16	20
4	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)

- Jones, Neil C., and Pavel Pevzner. An introduction to bioinformatics algorithms. MIT press, 2004.

2. Essential References

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• Lesk, Arthur. Introduction to bioinformatics. Oxford University Press, 2013.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
• **None.**

4- Electronic Materials, Web Sites etc.
• UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
• Software: Bioinformatics Packages.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
• Classroom with 35 seats for students.

2. Computing resources
• Software: Bioinformatics Packages.
• Internet Access.

3. Other resources
• None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
• Course action plans.

4. Processes for Verifying Standards of Student Achievement
• Student outcomes assessment.

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

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INFORMATION RETRIEVAL SYSTEMS

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Information Systems

A. Course Identification and General Information

1. Course title and code:	Information Retrieval Systems		23265415-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Information Systems	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		Elective	
6. Pre-requisites for this course (if any)		Advanced Programming (23164110-4)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
This course will discuss about Evaluation & Information Retrieval models, Text categorization & Statistical characteristics of text, Document filtering & information extraction, Parallel, Distributed & Multimedia retrieval, Types of information retrieval, systems and search engine, Query transformation and interface design, Visualization literacy, Usability research, Theories of visual perception and cognition, Visualization models and Visual analytics and data graphics.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
Introduction to IR; Document representation and retrieval models	2	6
Types of information retrieval systems and search engine	1	3
Document and query representation	1	3
Page Rank: exploiting document links IR and NLP: cross-linguistic information retrieval	2	6
Document filtering & information extraction	1	3
Query transformation	1	3

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Parallel, Distributed & Multimedia retrieval	1	3
Introduction to Information Visualization and Visualization literacy	2	3
Visual Principles, Theories of visual perception and cognition	1	3
Visualization models, Brushing, Linking, Animation and Dynamic Querying	1	3
Modern Information Retrieval, User interfaces and visualization	1	3
Visual analytics and Types of Data and Graphs	1	3

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
42	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

Upon finishing this course, the students should be able to:

1. Techniques behind Web search engines, E-commerce recommendation systems Tools and techniques to do cutting-edge research in the area of information retrieval or text mining.

2. Learn about different areas of information retrieval research systems. Design, develop and use information retrieval and search systems.

3. Principles of information storage and retrieval systems and databases.

4. Identifying and understanding the need for information visualization.

5. Design and construct visualizations

(ii) Teaching strategies to be used to develop that knowledge

- Lectures, Tutorials, Discussion.

(iii) Methods of assessment of knowledge acquired

- Written exams, Assignments, Presentation.

b. Cognitive Skills
    (i)   Description of cognitive skills to be developed

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• Students will be able to apply basic information retrieving and visualization skills by the end of the course
(ii) Teaching strategies to be used to develop these cognitive skills
• Lectures, Tutorials, Discussion.
(iii) Methods of assessment of student's cognitive skills
• Written exams, Assignments, Presentation.
c. Interpersonal Skills and Responsibility
(i) Description of the interpersonal skills and capacity to carry responsibility to be developed
• None
(ii) Teaching strategies to be used to develop these skills and abilities
• None
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility
• None
d. Communication, Information Technology and Numerical Skills
(i) Description of the skills to be developed in this domain.
(ii) Teaching strategies to be used to develop these skills
• Lectures, Tutorials, Discussion.
(iii) Methods of assessment of students numerical and communication skills
• Written exams, Assignments, Presentation.
e. Psychomotor Skills (if applicable)
(i) Description of the psychomotor skills to be developed and the level of performance required
• None.
(ii) Teaching strategies to be used to develop these skills
• None.
(iii) Methods of assessment of student's psychomotor skills
• None.

5. Schedule of Assessment Tasks for Students During the Semester

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No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Class Activity	3-16	10
4	Quizzes	16	10
5	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- Search Engines: Information Retrieval in Practice by Croft, B., Metzler, D., Strohman, T., 1st Edition, Addison Wesley, 2009.

2. Essential References
- Modern Information Retrieval by Baeza-Yates, Ricardo &Ribeiro-Neto, Berthier., 2nd Edition, Addison-Wesley, 2011
- Information Visualization by Spence, Robert., 1st edition, Addison Wesley, 2000.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- Software: Basic applications

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- Software: Basic applications
- Internet Access.

3. Other resources

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• None.

G. Course Evaluation and Improvement Processes

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

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SELECTED TOPICS I

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Selected Topics I		23165416-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		Elective	
6. Pre-requisites for this course (if any)		Assigned by Curriculum Committee	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

This course introduces some up-to-date topics and skills which are recently appears in computer science areas.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
New topics in computer science (assigned by the curriculum committee and approved by the department council).	15	45

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

   3-4 hours/week.

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

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(i) Description of the knowledge to be acquired
1. Students understand and follow-up some new topics and skills which are recently appears in computer science areas.
(ii) Teaching strategies to be used to develop that knowledge
• Lectures, Projects, Research, Self-study, Discussion, Workshops.
(iii) Methods of assessment of knowledge acquired
• Written exams, Assignments, Reports, Project Discussion and Demo, Presentation.
b. Cognitive Skills
(i) Description of cognitive skills to be developed
• None.
(ii) Teaching strategies to be used to develop these cognitive skills
• None.
(iii) Methods of assessment of student's cognitive skills
• None.
c. Interpersonal Skills and Responsibility
(i) Description of the interpersonal skills and capacity to carry responsibility to be developed
2. Students are required to act as a one team to design and implement a software project.
(ii) Teaching strategies to be used to develop these skills and abilities
• Projects, Discussion.
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility
• Reports, Project Discussion and Demo.
d. Communication, Information Technology and Numerical Skills
(i) Description of the skills to be developed in this domain.
3. An ability to communicate effectively with a range of audiences and within a project team.
(ii) Teaching strategies to be used to develop these skills
• Projects, Research, Discussion, Workshops.
(iii) Methods of assessment of students numerical and communication skills
• Reports, Project Discussion and Demo, Presentation.
e. Psychomotor Skills (if applicable)

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(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Projects	16	20
4	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- To be assigned by the curriculum committee.

2. Essential References
- To be assigned by the curriculum committee.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- To be assigned by the curriculum committee.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)

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• Classroom with 35 seats for students.
2. Computing resources   • To be assigned by the curriculum committee.
3. Other resources   • None.

G. Course Evaluation and Improvement Processes

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

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SELECTED TOPICS II
NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Selected Topics II		23165417-3
2. Credit hours:	3		
3. Program(s) in which the course is offered:		Computer Science	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		Elective	
6. Pre-requisites for this course (if any)		Assigned by Curriculum Committee	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
This course introduces some up-to-date topics and skills which are recently appears in computer science areas.

2. Briefly describe 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

1. Topics to be Covered

List of Topics	No of Weeks	Contact hours
New topics in computer science (assigned by the curriculum committee and approved by the department council).	15	45

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

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
45	0	0	0	0

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

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

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(i) Description of the knowledge to be acquired
2. Students understand and follow-up some new topics and skills which are recently appears in computer science areas.
(ii) Teaching strategies to be used to develop that knowledge
• Lectures, Projects, Research, Self-study, Discussion, Workshops.
(iii) Methods of assessment of knowledge acquired
• Written exams, Assignments, Reports, Project Discussion and Demo, Presentation.
b. Cognitive Skills
(i) Description of cognitive skills to be developed
• None.
(ii) Teaching strategies to be used to develop these cognitive skills
• None.
(iii) Methods of assessment of student's cognitive skills
• None.
c. Interpersonal Skills and Responsibility
(i) Description of the interpersonal skills and capacity to carry responsibility to be developed
3. Students are required to act as a one team to design and implement a software project.
(ii) Teaching strategies to be used to develop these skills and abilities
• Projects, Discussion.
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility
• Reports, Project Discussion and Demo.
d. Communication, Information Technology and Numerical Skills
(i) Description of the skills to be developed in this domain.
4. An ability to communicate effectively with a range of audiences and within a project team.
(ii) Teaching strategies to be used to develop these skills
• Projects, Research, Discussion, Workshops.
(iii) Methods of assessment of students numerical and communication skills
• Reports, Project Discussion and Demo, Presentation.
e. Psychomotor Skills (if applicable)

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(i) Description of the psychomotor skills to be developed and the level of performance required

- None.

(ii) Teaching strategies to be used to develop these skills

- None.

(iii) Methods of assessment of student's psychomotor skills

- None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Midterm Exam 1	5-7	20
2	Midterm Exam 2	12-13	20
3	Projects	16	20
4	Final Exam	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- To be assigned by the curriculum committee.

2. Essential References
- To be assigned by the curriculum committee.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
- To be assigned by the curriculum committee.

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)

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• Classroom with 35 seats for students.

2. Computing resources
• To be assigned by the curriculum committee.
3. Other resources
• None.

G. Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching
• Course evaluation surveys.
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department
• None.

3. Processes for Improvement of Teaching
• Course action plans.
4. Processes for Verifying Standards of Student Achievement
• Student outcomes assessment.

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

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GRADUATION PROJECT I

NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Graduation Project I	23165502-4
2. Credit hours:	4	
3. Program(s) in which the course is offered:		Computer Science
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)
5. Level/year at which this course is offered		9/5
6. Pre-requisites for this course (if any)		Software Engineering I (23164303-3)
7. Co-requisites for this course (if any)		None
8. Location if not on main campus		Jamoum Campus

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
Upon completing this course, students should be able to develop projects that demonstrate their intellectual, technical and creative abilities. Students should develop the projects under the direction and supervision of faculty members. Moreover, students should gain lifelong learning skills and interface to real life applications. The main practical skills are related to software development processes. Specifically, students should practice in project management, system analysis and design, and software development documentation and presentation.
2. Briefly describe 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

1. Topics to be Covered		
List of Topics	No of Weeks	Contact hours
Project Initialization - Survey and research component	5	30
System software analysis and design	5	30
Software develop documentation and project presentation	5	30

2. Course components (total contact hours per semester):				
Lecture	**Tutorial**	**Laboratory**	**Practical/Field work/Internship**	**Other: None**
15	**0**	**75**	**0**	**0**

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3. Additional private study/learning hours expected for students per week.
4-5 hours/week.

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4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

1. Apply knowledge of computing appropriate to the discipline.
2. Analyze a problem, and identify and define the computing requirements appropriate to its solution.
3. Function effectively on teams to accomplish a common goal.
4. Understand professional, ethical, legal, security, and social issues.
5. Communicate effectively with a range of audiences.
6. Analyze the local and global impact of computing on individuals, organizations and society.
7. Use current techniques, skills, and tools necessary for computing practices.
8. Apply mathematical foundations, algorithmic principles, and computer theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
9. Apply design and development principles in the construction of software systems of varying complexity.

(ii) Teaching strategies to be used to develop that knowledge

- Projects.

(iii) Methods of assessment of knowledge acquired

- Project Discussion, Presentation and Posters.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

- The use of scientific, engineering, and knowledgeable skills in the writing the proposed graduation project
- How to choose the subject of the graduation project
- Design and planning of the graduation project.
- Participation in the one team groups to implement the objectives of the graduation project.
- The student's ability to collect and analyze data, interpret and draw conclusions
- The student's ability to develop scientific and practical thinking
- Evaluate designs and the development of alternative solutions and find out their impact on the environment

(ii) Teaching strategies to be used to develop these cognitive skills

- Projects and Discussion.

(iii) Methods of assessment of student's cognitive skills

- Project Discussion and Demo, Presentation, Posters.

c. Interpersonal Skills and Responsibility

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(i) Description of the interpersonal skills and capacity to carry responsibility to be developed
• Ability to work within a team.
• The ability to communicate with people outside of the project.
(ii) Teaching strategies to be used to develop these skills and abilities
• Projects and Discussion.
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility
• Project Discussion and Demo, Presentation, Posters.
d. Communication, Information Technology and Numerical Skills
(i) Description of the skills to be developed in this domain.
• The ability to read scientific literature and analysis
• The ability to write reports
(ii) Teaching strategies to be used to develop these skills
• Projects and Discussion.
(iii) Methods of assessment of students numerical and communication skills
• Project Discussion and Demo, Presentation, Posters.
e. Psychomotor Skills (if applicable)
(i) Description of the psychomotor skills to be developed and the level of performance required
• None.
(ii) Teaching strategies to be used to develop these skills
• None.
(iii) Methods of assessment of student's psychomotor skills
• None.

5. Schedule of Assessment Tasks for Students During the Semester			
No	**Assessment task**	**Week due**	**Proportion of Final Assessment**
1	Discussion of literature review	5-7	15
2	Evaluating the proposed system analysis and design	12-13	15
3	Presentations and progress reports	16	15
4	Project submission	16	15

5	Project examination	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- Ian Sommerville, Software Engineering, 9th Edition, Addison-Wesley, 2011.

2. Essential References
- M. Shooman, Software Engineering, Mcgraw-Hall, 2001.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
-

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- Internet Access.
- Specialized computer laboratories (max 16 students per session)
  - Project Lab

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

3. Processes for Improvement of Teaching
- Course action plans.

4. Processes for Verifying Standards of Student Achievement

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- Student outcomes assessment.

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

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GRADUATION PROJECT II
NCAAA Course Specification

Institution:	Umm Al-Qura University
College	Jamoum University College
Department	Computers

A. Course Identification and General Information

1. Course title and code:	Graduation Project II		23165503-4
2. Credit hours:	4		
3. Program(s) in which the course is offered:		Computer Science	
4. Name of faculty member responsible for the course:		The Course Coordinator (Assigned by Curriculum Committee)	
5. Level/year at which this course is offered		10/5	
6. Pre-requisites for this course (if any)		Software Engineering II (23164304-3) Graduation Project I (23165502-4)	
7. Co-requisites for this course (if any)		None	
8. Location if not on main campus		Jamoum Campus	

B. Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
Upon completing this course, students should be able to students develop projects that demonstrate their intellectual, technical and creative abilities. Students develop the projects under the direction and supervision of faculty members. Moreover, students gain lifelong learning skills and interface to real life applications. The main practical outcomes are related to software development processes. Specifically, students should practice in project management, system restriction, system analysis and design, software implementation and testing, software development documentation and presentation, and project demonstration.

2. Briefly describe 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

1. Topics to be Covered		
List of Topics	No of Weeks	Contact hours
Project Initialization - Survey and research component	2	12
System software analysis and design	2	12
Software implementation and testing	11	66

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

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Umm Al-Qura University
Jamoum University College
Dept. of Computers

Lecture	Tutorial	Laboratory	Practical/Field work/Internship	Other: None
15	0	75	0	0

3. Additional private study/learning hours expected for students per week.
   4-5 hours/week.

4. Development of Learning Outcomes in Domains of Learning

a. Knowledge

(i) Description of the knowledge to be acquired

   1. Apply knowledge of computing appropriate to the discipline.
   2. Analyze a problem, and identify and define the computing requirements appropriate to its solution.
   3. Design, implement and evaluate a computer-based system, process, component, or program to meet desired needs.
   4. Function effectively on teams to accomplish a common goal.
   5. Understand professional, ethical, legal, security, and social issues.
   6. Communicate effectively with a range of audiences.
   7. Analyze the local and global impact of computing on individuals, organizations and society.
   8. Use current techniques, skills, and tools necessary for computing practices.
   9. Apply mathematical foundations, algorithmic principles, and computer theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
   10. Apply design and development principles in the construction of software systems of varying complexity.

(ii) Teaching strategies to be used to develop that knowledge

   • Projects.

(iii) Methods of assessment of knowledge acquired

   • Project Discussion, Presentation and Posters.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

   • Identify and formulate computer science problems
   • Applying the computer science knowledge and skills learned throughout the program
   • ability to analyze and design a system component with defined constraints

(ii) Teaching strategies to be used to develop these cognitive skills

   • Projects and Discussion.

(iii) Methods of assessment of student's cognitive skills

   • Project Discussion and Demo, Presentation, Posters.

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c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed
   • Ability to work within a team.
   • The ability to communicate with people outside of the project.

(ii) Teaching strategies to be used to develop these skills and abilities   • Projects and Discussion.
(iii) Methods of assessment of student's interpersonal skills and capacity to carry responsibility   • Project Discussion and Demo, Presentation, Posters.
d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.
 	
   • The ability to read scientific literature and analysis.
   • The ability to implement a computer software.
   • The ability to write reports.

(ii) Teaching strategies to be used to develop these skills   • Projects and Discussion.
(iii) Methods of assessment of students numerical and communication skills   • Project Discussion and Demo, Presentation, Posters.
e. Psychomotor Skills (if applicable)
(i) Description of the psychomotor skills to be developed and the level of performance required   • None.
(ii) Teaching strategies to be used to develop these skills   • None.
(iii) Methods of assessment of student's psychomotor skills   • None.

5. Schedule of Assessment Tasks for Students During the Semester

No	Assessment task	Week due	Proportion of Final Assessment
1	Discussion of literature review	5-7	15
2	Evaluating the proposed system analysis and design	12-13	15
3	Presentations of the implementation	16	15

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4	Project submission	16	15
5	Project examination	17-18	40
		Total	100

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice.

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

E. Learning Resources

1. Required Text(s)
- Ian Sommerville, Software Engineering, 9th Edition, Addison-Wesley, 2011.

2. Essential References
- M. Shooman, Software Engineering, Mcgraw-Hall, 2001.

3- Recommended Books and Reference Material (Journals, Reports, etc.) (Attach List)
- **None.**

4- Electronic Materials, Web Sites etc.
- UQU e-learning portal.

5- Other learning material such as computer-based programs/CD, professional standards/regulations
-

F. Facilities Required

1. Accommodation (Lecture rooms, laboratories, etc.)
- Classroom with 35 seats for students.

2. Computing resources
- Internet Access.
- Specialized computer laboratories (max 16 students per session)
  o Project Lab

3. Other resources
- None.

G. Course Evaluation and Improvement Processes

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

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

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3. Processes for Improvement of Teaching   • Course action plans.
4. Processes for Verifying Standards of Student Achievement   • Student outcomes assessment.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.   • The student outcomes assessment process is carried every other year.