اعتماد
NCAAA

T4

2020

Course Specifications

Course Title:	Computer Organization
Course Code:	**CEN2231**
Program:	**Computer and Network Engineering**
Department:	**Computer Engineering Department**
College:	**College of computers and information systems**
Institution:	**Umm Al-Qura University**

Table of Contents

A. Course Identification

1. Credit hours: ٤	

2. Course type

a.	University	☐	College	☐	Department	√	Others	☐
b.		Required	√		Elective	☐		

3. Level/year at which this course is offered: Level 5/ Year 2

4. Pre-requisites for this course (if any)**:**
Digital logic design

5. Co-requisites for this course (if any)**:**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	60	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	30
2	**Laboratory/Studio**	30
3	**Tutorial**	
4	**Others** (specify)	
	Total	

B. Course Objectives and Learning Outcomes

1. Course Description

This course covers the internal structure of computers, machine (assembly) language programming. Topics include computer instruction set architecture, basic computer arithmetic algorithms, data-path and pipelining and memory hierarchy.

2. Course Main Objective

- An ability to evaluate and analyze computer performance.
- An ability to understand computer instruction set architecture.
- An understanding of basic computer arithmetic algorithms.
- An ability to understand data-path and pipelining.
- An ability to analyze and evaluate memory hierarchy.
- An ability to understand I/O and storage devices.

Course Specifications

- An ability to write assembly language programs using MIPS assembly language.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Students will learn the fundamentals of computer organization, and its relevance to classical and modern problems of computer design.	K1
1.2	Students will be able to identify where, when, and how enhancements of computer performance can be accomplished	K2
2	**Skills :**	
2.1	Understand and communicate to others the importance and relevance of computer organization and architecture in the modern world.	S4
2.2	The ability to write assembly language programs using MIPS assembly language.	S1
3	**Values:**	
3.1	Group report and group presentation: to identify leaders, followers, hard-workers, contributors, slackers and to see whether students are comfortable in working with their peers.	V2
3.2	Accountability.	V1

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to computer organization and architecture	3
2	Instruction-set architecture (ISA) for MIPS	18
3	Implementation of ISA (Datapath and controller)	18
4	Pipelined Datapath and controller	6
5	Hazards in pipelining and remedies	6
6	Introduction to memory hierarchy design	3
7	Cache and virtual memory design	3
8	Storage and I/O devices	3
Total		60

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	Students will learn the fundamentals of computer organization, and its relevance to classical and modern problems of computer design	• Lectures.	• Quizzes, Midterm, and Final Exam. • Review outputs from the assignments in the computer lab.
1.2	Students will be able to identify where, when, and how enhancements of computer performance can be accomplished.		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.0	**Skills**		
2.1	Understand and communicate to others the importance and relevance of computer organization and architecture in the modern world.	• lectures • Lab experiments.	• Examinations • Lab Assignments • Quizzes
2.2	The ability to write assembly language programs using MIPS assembly language		
3.0	**Values**		
3.1	Group report and group presentation: to identify leaders, followers, hard-workers, contributors, slackers and to see whether students are comfortable in working with their peers.	• Group presentations and reports	• Report and presentation assessments
3.2	Accountability.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes	4,8	10%
2	Midterms	5,10	20%
3	Laboratory work	Throughout the semester	25%
4	Presentations	Throughout the semester	5%
5	Final exam	12	40%

Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

Faculty is available 10 hours per week for student help and consulting.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	D. Patterson and J. Hennessy, Computer Organization and Design, The Hardware/Software Interface, 5th Edition, Morgan Kaufmann (MK), 2013
Essential References Materials	D. Harris and S. Harris, Digital Design and Computer Architecture, Morgan Kaufmann (MK), 2nd Edition, 2012
Electronic Materials	

Other Learning Materials	Use of Simulators in Lab

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Classrooms. • Computer Laboratories.
Technology Resources (AV, data show, Smart Board, software, etc.)	projector and electronic board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching	Students	Survey at the end of course
Evaluation of Teaching	Instructor	Monthly Meeting discussing

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	