



Course Specification

(Bachelor)

Course Title: **Computer Architecture**

Course Code: **CENX 316**

Program: **B.S. in Computer Engineering**

Department: **Department of Computer Engineering**

College: **College of Computer and Information Sciences**

Institution: **King Saud University**

Version: *Course Specification Version Number*

Last Revision Date: *Pick Revision Date.*

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A. General information about the course:

1. Course Identification

1. Credit hours: (3 hours)

2. Course type

A. ☐ University ☐ College ☐ Department ☐ Track ☐ Others
B. ☒ Required ☐ Elective

3. Level/year at which this course is offered: (Level 6)

4. Course general Description:

History and factors affecting the advances in processor design. Basic computer organization. Performance evaluation and metrics. Assembly Language of MIPS processor. Instruction formats, instruction sets and their design. Integer and floating-point representations and arithmetic operations. Data path design. Control design, pipelining and their effect on performance. Memory Hierarchy Organization and its effect on performance. I/O Systems.

5. Pre-requirements for this course (if any):

CENX 212, Digital Logic Design 2

6. Co-requirements for this course (if any):

7. Course Main Objective(s):

This course provides students with basic knowledge in computer architecture hardware as well as the assembly language to program the processor.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	4 hours per week	100%
2	E-learning		
3	Hybrid - Traditional classroom - E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)



No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Describe floating-point representations and how arithmetic operations are performed.	1	Lectures and Tutorials	Exams and Homework
1.2	Explain different forms of memory organization and their effect on computer performance.	1	Lectures and Tutorials	Exams and Homework
2.0	Skills			
2.1	Write programs in assembly language.	2	Lectures and Tutorials	Exams and Homework
2.2	Draw the pipeline execution diagram by observing different techniques related to pipelining (hazards, forwarding, and branch prediction).	2	Lectures and Tutorials	Exams and Homework
2.3	Design a datapath and control unit for a simple instruction set architecture	2	Lectures and Tutorials	Exams and Homework
3.0	Values, autonomy, and responsibility			
3.1	Analyze computer performance based on different aspects of	6	Lectures and Tutorials	Exams and Homework



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	hardware and software technology.			

C. Course Content

No	List of Topics	Contact Hours
1.	Course Introduction, Computer Abstraction and Technology	8
2.	Instruction Set and Assembly Programming	12
3.	Arithmetic for Computers	8
4.	The Processor: Data path and Control	16
5.	Memory Hierarchy	8
6.	Storage and other I/O topics	8
Total		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm Examination (1)	6	20%
2.	Midterm Examination (2)	12	20%
3.	Homework Assignments	Weekly	20%
4.	Final Exam	End	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Computer Organization and Design: The Hardware/Software Interface (5th Edition), Hennessy and Patterson, 2014.
Supportive References	
Electronic Materials	https://lms.ksu.edu.sa
Other Learning Materials	

2. Required Facilities and equipment



Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room with number of seats enough to accommodate enrolled students.
Technology equipment (projector, smart board, software)	Overhead projector with required software to facilitate presentations on smart board.
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Department Council	Course reports are evaluated by the Department Council.
Effectiveness of Students assessment	Faculty-Peer Review	Final examination is moderated.
Quality of learning resources	Students	Indirect – Edu-gate survey.
The extent to which CLOs have been achieved	Students	Attainment level of every CLO is measured directly.
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	

