Course Specification
— (Bachelor)

Course Title: Computer Organization and Architecture

Course Code: CS1255

Program: Computer Science

Department: Computer Science & Engineering

College: Computer Science and information technology

Institution: Albaha University

Version: 2

Last Revision Date: October 2023

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3)

2. Course type

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

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

4. Course general Description:

This course provides students with basic knowledge in: Fundamentals of computer design, Performance evaluation, Instruction set principles, Processor organization and design, Pipelining, Instruction and arithmetic pipelines, Dynamic and speculative execution, Precise exception, CISC, RISC, and VLIW processors, Memory Hierarchy, Virtual memory, Multilevel caches, Storage and I/O, Introduction to Multi-core, multiprocessors, and clusters, New trends in computer architecture.

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

Digital logic design (CS1254)

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

None

7. Course Main Objective(s):

The main purpose for this course is to teach students how to:
- · Outline the evolution of computer architecture
- · Recognize computer components and their interconnections
- · Memorize the logic and the number system behind the computer revolution as well as the instruction sets and their relevance to computing
- · Analyze a range of architectural and technological concepts for computer operation.
- · Work both independently and collaboratively
- ● Communicate concepts and techniques in oral presentations Work both independently and collaboratively.
- ● Communicate concepts and techniques in oral presentations.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	33	100%
2	E-learning		

No	Mode of Instruction	Contact Hours	Percentage
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	33
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		33

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 the evolution of computer architecture	K1	- Lectures - Multimedia presentation - Discussions	- Home work (rubric) - Quizzes - Midterm exam - Final Exam
1.2	recognize computer components and their interconnections	K2	- Lectures - Multimedia presentation Discussions	- Home work (rubric) - Quizzes - Midterm exam Final Exam
1.3	review the logic and the number system behind the computer	K2	- Lectures - Multimedia presentation - Discussions	- Home work (rubric) - Midterm exam

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	revolution as well as the instruction sets and their relevance to computing		- Guest lectures - Multimedia Presentations - Demonstrations - Practice Exercises - Tutorials Seminars	Final Exam
2.0	**Skills**			
2.1	Explore the fundamentals of data communication systems.	S1	- Demonstrations - Labs Lectures - Group Discussion - Group Projects - Case Studies	- Home work (rubric) - Quizzes - Final Exam Project evaluation form (rubric)
2.2	Test the different data transmission techniques	S3	- Slide Presentations - Multimedia Presentations - Demonstrations - Debates/Discussions Group Projects	- Viva-voce (Rubric) Presentation Assessment (Rubric)
3.0	**Values, autonomy, and responsibility**			
3.1	Work both independently and collaboratively	V1	- Presentation - Guest Lectures - Debates/Discussions - Group Projects - Team-based Learning - Case Studies Seminars	- Rubrics Note Cards

C. Course Content

No	List of Topics	Contact Hours
1.		
2.		

| --- | | |
| **Total** | | |

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Introduction	2	
2.	Evolution of computers, their architecture, and performance	2	
3. 3	Computer components, function, and interconnection	4	
4	Number Systems	2	
5	Digital Logic	4	
6	Computer Arithmetics	2	
7	Memory – cache, internal, and external	7	
8	Input/output	2	
9	Processor structure & function	4	
10	Project presentation	4	

*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	William Stallings, Computer Organization and Architecture: Designing for Performance, 9th Edition, Prentice Hall, 2012.
Supportive References	- Morris Mano, Computer System Architecture, 2nd Custom Edition, Pearson, 2005
Electronic Materials	- ACM (Association for Computer Machinery) web site - http://www.acm.org/ - ACM SIGARCH (Special Interest Group on Computer Architecture) - http://www.sigarch.org/ - IEEE Computer Society web site - http://www.computer.org/portal/web/guest/home Open access course material online
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	An instructor computer station with: – High speed Internet connection – A desktop computer with a programming development tool – Power outlets for instructor's laptop plug-in Lecture rooms provide enough space for the students.
Technology Resources (AV, data show, Smart Board, software, etc.)	– A digital image projection system with connection to desktop computer and laptop computer. – High speed Internet connection. An instructor computer station
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of Teaching	• Students • Faculty • Peer Reviewers • Program Leader Course Coordinator	• Surveys (indirect). • Direct feedback from students (interview between Program leader and students). • Course evaluation by Peer Reviewers (indirect). • Class visit by Program Leader Comprehensive Course report (where we can find information about teaching difficulties and action plan, …)
Effectiveness of Assessment	• Students • Faculty • Peer Reviewers • Course Coordinator • Exam Evaluation Committee Course Coordinator	• Surveys (indirect). • Direct feedback from students (interview between Program leader and students). • Assessment results (direct) • Course evaluation by Peer Reviewers (indirect).

Assessment Areas/Issues	Assessor	Assessment Methods
		• Comprehensive Course report (where we can find information about assessment difficulties and action plan, …) Exam evaluation by the Exam Evaluation Committee (indirect)
Extent of achievement of course learning outcomes	• Faculty • Program Leader • Course Coordinator	• Student Results (direct) Comprehensive Course report (where we can find the CLO assessment results)
Quality of learning resources	• Students • Faculty • Peer Reviewers Course Coordinator	• Surveys (indirect) • Course evaluation by Peer Reviewers (indirect). Comprehensive Course report (where we can find information about difficulties and challenges about learning resources as well as consequences and action plan, …)
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Curriculum Committee Meeting
REFERENCE NO.	
DATE	**6 OCTOBER 2023**