هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission
اعتماد
NCAAA
2024
TP-153

Course Specification
(Bachelor)

Course Title:	Computer Architecture
Course Code:	313-CCN-3
Program:	Bachelor of Science in Computer Networks
Department: :	Networks and Communications Engineering
College:	College of Computer Science and Information Systems
Institution: :	Najran University
Version:	1.0
Last Revision Date:	15 February 2025

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2, 2, 1) [Theory, Lab, Tutorial])					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 5/ Year 3)					
4. Course General Description:					
This course introduces the basic structure of computers relating the computer basic unit organization and design such as interconnection, memory, input/output, operating systems, arithmetic and logic unit, and registers with computer instructions and addressing modes. This course is a study of the fundamental concepts in the design and organization of modern computer systems. **It also discusses machine instructions, MIPS and programs, performance enhancements, floating-point operations, basic processing units, multiprocessing, pipeline concepts and distributed architectures and the latest technologies in computing.**					
5. Pre-requirements for this course (if any):					
211CNN-3					
6. Co-requisites for this course (if any):					
N/A					
7. Course Main Objective(s):					
The main objective of this course is to make the students be able to: • **Describe the basic processing units of the computer.** • **Recognize the current architecture of computer systems (data representation, performance enhancement, CPU, memory hierarchy design, I/O design).** • **Discuss the latest technology in computer science with Modern Architecture.**					

- **Apply conversion formula among different number systems used in digital computers.**

Compare different types of instruction set architectures and addressing modes.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	75	١٠٠%
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**	[2 contact hours ´ 15 weeks]	30
2.	**Laboratory/Studio**	[2 contact hours ´ 15 weeks]	30
3.	**Field**		
4.	**Tutorial**	[1 contact hour ´ 15 weeks]	15
5.	**Others (specify)**		
Total			**Total**

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Recognize the current architecture of computer systems (data representation, performance enhancement, CPU,	K_1	TS-1: Relate Course Learning Outcomes (CLOs) to the topics in each chapter. TS-2: Lectures: using PPT	Locally Developed Exams such as Quiz, Mid Exam, & Final Exam

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	memory hierarchy design, I/O design).		presentation to address verbally in front of students the concepts associated with examples with taking help of writing on the board as needed. TS-3: Engaging the students in problem-based learning through Tutorials. TS-4: Lab Demonstrations TS-5: Motivating Student: Motivating students to be active during class by asking questions regularly during lecture and giving them assignments to enforce the students to work in home, to search data from internet and to read related reference books. TS-6: Recall the topics of last lecture.	
1.2	Describe the basic processing units of the computer.	K_1		Locally Developed Exams such as Quiz, Mid

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
				Exam, & Final Exam
...				
2.0	**Skills**			
2.1	Apply conversion formula among different number systems used in digital computers	S_4, S_5	TS-1: Relate Course Learning Outcomes (CLOs) to the topics in each chapter. TS-2: Lectures: using PPT presentation to address verbally in front of students the concepts associated with examples with taking help of writing on the board as needed. TS-3: Engaging the students in problem-based learning through Tutorials TS-4: Lab Demonstrations TS-5: Motivating Student: Motivating students to be active during class by asking questions regularly during lecture and giving them assignments to enforce the students to work in home, to search	Locally Developed Exams such as Quiz, Mid Exam & Final Exam

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			data from internet and to read related reference books. TS-6: Recall the topics of last lecture.	
2.2	Discuss the latest technology in computer science with modern architecture	S_4		Locally Developed Exams such as Quiz, Mid Exam & Final Exam
...	Compare different types of instruction set architectures and addressing modes	S_1, S_2		Locally Developed Exams such as Quiz, Lab Assessments, Mid Exam, Final Lab Exam & Final Exam
3.0	**Values, autonomy, and responsibility**			
3.1				
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Computer Organization and Architecture	5
2.	Number Systems and Data Representation	5
3.	Digital Logic and Circuits Design Basic ALU architecture and components (Combinational circuits, Half adder, full adder), Decoders, Encoders, Flip Flops	10
4.	Assembly Language Basics, Data movement instructions; arithmetic instructions and flags	10
5.	Performance analysis, Amdahl's Law, CPI, MIPS	10
6.	Unsigned and signed Integer representation, integer arithmetic	10

7.	Floating point representation and arithmetic	10
8.	CPU and processing unit and I/O design	10
9.	Memory unit and cache memory	5
10.	Introduction to Pipelining and parallel computation	5
Total		75

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	3rd week	10%
2.	Assignments or mini project (presentation)	5th week	10%
3.	Midterm	6th week	20%
4.	Lab Performance & Assessment	Every week	10%
5.	Final Lab Exam	15th week	10%
6.	Final Theory Exam	16th or 17th week	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	1. Kip R. Irvine, Assembly Language for Intel-Based Computers, Prentice Hall; 5th edition 2. John L. Hennessy and David A. Patterson, Computer Architecture- A quantitative approach, Morgan Kaufmann; 6th edition, 2017 Carl Hamacher, Zvonko Vranesic and Safwat Zaky, Computer Organization, McGraw Hill, 5th Edition
Supportive References	1. William Stalling, Computer Organization and Architecture, Pearson, 11th edition,2019. M. Morris Mano, Computer System Architecture, Revised 3rd edition, Pearson's, 2017
Electronic Materials	-
Other Learning Materials	Logisim and Microsoft Assembler (MASM) Software

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	• Smart Boards may be provided to carry out the demonstrations and lectures. The classroom that has minimum of 25-30 seats and laboratories that has at least 20 PCs
Technology equipment (projector, smart board, software)	• The laboratory may be equipped with a network so that the students have their privacy (by providing logins) in accessing their files with limited permissions of accessibility. All the computers in all the laboratories may be installed with the MASM and Logisim software
Other equipment (depending on the nature of the specialty)	• Upgraded Anti-Virus with long-term validity may be installed in all the systems in the lab. Printers should be installed in each lab to enable the students to take the printout of their lab work.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Course Students	Online Course Survey
Effectiveness of Students assessment	Course Students	Online Course Survey
Quality of learning resources	Course Instructor	Course Assessments such as Exams, Quiz, Lab Performance
The extent to which CLOs have been achieved	Course Instructor	Course Assessments such as Exams, Quiz, Lab Performance
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	NETWORK AND COMMUNICATIONS ENGINEERING DEPARTMENT COUNCIL
REFERENCE NO.	**14450824-0482-00014**
DATE	**5/3/2024**