



Course Specifications

Course Title:	Computer Architecture
Course Code:	503323-3
Program:	Bachelor in Computer Engineering
Department:	Department of Computer Engineering
College:	College of Computers and Information Technology
Institution:	Taif University

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A. Course Identification

1. Credit hours: 3
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 5/3
4. Pre-requisites for this course (if any): Digital Logic Design (503221-4)
5. Co-requisites for this course (if any): NON

6. Mode of Instruction (mark all that apply)

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

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	45
2	Laboratory/Studio	
3	Tutorial	
4	Others (specify)	
	Total	45

B. Course Objectives and Learning Outcomes

1. Course Description

This course will provide the student with an in-depth study of the organization of the central processing unit, arithmetic logic unit, control unit, instruction set design, and addressing modes of digital computers. Register Transfer model of processors and data paths are considered. Extensive emphasis is placed on the translation of assembly language instructions into their micro sequence operations within the control unit. Both hardwire and microprogramming techniques will be covered. Modern architectures and its features (Von-Neumann vs Harvard Architecture). Parallel architecture and inter-connection networks.

2. Course Main Objective

1. Analyze and Design digital hardware modules used in digital computers
2. Organize and design a basic digital computer according to a given set of specifications (including ALU, Instruction Formats, Addressing modes, and Data Transfer.
3. Program the Basic Computer using Machine language, Assembly language, and 2-pass Assembler.



4. Analyze the different organizations of the central processing unit.
5. Be acquainted with pipelining and vector processing as well as multiprocessing

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Define the basic concepts and goals of Computer Architecture	K1
1.2	Understand Logical organization of computer systems	K1
1.3	Understand modern architectures and its features (Von-Neumann vs Harvard Architecture)	K1
1.4	Explain the fundamental concepts of parallel architecture and interconnection networks	K1
2	Skills :	
2.1	Design and implement subsystems including arithmetic and logical units control units memory and I/O devices	S1
2.2		
2.3		
2...		
3	Values:	
3.1		
3.2		
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Computer Architecture	3
2	Digital Logic Circuits and Components	5
3	Number Systems, Arithmetic operations	5
4	Register Transfer Language and MicroOps	5
5	Basic Computer Organization and Design	5
6	Computer Arithmetic Unit Design	5
7	Programming the Basic Computer	4
8	Central Processing Unit CPU Design	5
9	Pipeline and Vector Processing	5
10	Multiprocessor Design	3
Total		45

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	Define the basic concepts and goals of Computer Architecture	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments



1.2	Understand Logical organization of computer systems	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
1.3	Understand modern architectures and its features (Von-Neumann vs Harvard Architecture)	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
1.4	Explain the fundamental concepts of parallel architecture and interconnection networks	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
2.0	Skills		
2.1	Design and implement subsystems including arithmetic and logical units control units memory and I/O devices	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
2.2			
...			
3.0	Values		
3.1			
3.2			
...			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignments	Continues	10%
2	Midterm Exam	7	25%
3	Project	12	15%
4	Quizzes	Continues	10%
5	Final Exam	16	40%
6			
7			
8			

*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 :

Teaching staff provide at least 6 office hours for students to help them in the course as well as in any other academic issues.

F. Learning Resources and Facilities



1. Learning Resources

Required Textbooks	William Stallings, Computer Organization and Architecture, 9 th edition 2013.
Essential References Materials	John L. Hennessey and David L. Patterson, Computer Organization and Design: The Hardware/Software Interface, Morgan Kaufmann Publishers, 4th Ed, 2009
Electronic Materials	
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Traditional Classrooms
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show
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
Extent of achievement of course learning outcomes	Students	Indirect (Survey)
Effectiveness of teaching and assessment	Students	Indirect (Survey)
Extent of achievement of course learning outcomes	Faculty	Course Report

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	Computer Engineering Council / Curriculum Committee
Reference No.	16
Date	27/12/2019

