Course Specification
(Bachelor)

Course Title:	Microprocessors & Assembly Language Programming
Course Code:	501326-3
Program:	Bachelor of Computer Science
Department:	Department of Computer Science
College:	College of Computers and Information Technology
Institution:	Taif University
Version:	1
Last Revision Date:	2024

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: (5TH)					
4. Course general Description:					
Microprocessor architecture and systems. Assembly language programming of microprocessors, data representation, addressing and instruction sets, I/O programming, interrupts, assembly process, cross assemblers and debugging.					
5. Pre-requirements for this course (if any)**:**					
503220-3 Digital Logic Design					
6. Co-requirements for this course (if any)**:**					
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7. Course Main Objective(s):					
● To introduce the basic concepts of microprocessor architecture. ● To learn assembly language programming skills. ● To provide extensive knowledge of microprocessor-based systems and interfacing.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3	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**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
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	Understand the basic architecture of a current 16bit microprocessor with hands on experience.	**K1**	Lectures	**Direct** Quizzes/ Homework Exams **Indirect** Course Exit Survey
1.2	Understand Memory Addressing Segment and Offset Addressing Data Addressing Modes Program Memory Addressing Modes and Stack Memory Addressing Modes.	**K1**	Lectures Labs	**Direct** Quizzes/ Homework Exams **Indirect** Course Exit Survey
1.3	Understand the correspondence between instruction execution and the timing signals on the microprocessor external buses and pins	**K1**	Lectures Labs	**Direct** Quizzes/ Homework Exams **Indirect** Course Exit Survey
2.0	**Skills**			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.1	Use assembly language for programming of the target microprocessor.	**S1**	Lectures Labs	**Direct** Quizzes/ Homework Exams **Indirect** Course Exit Survey
2.2	Apply the interrupt structures and microprocessor interfacing to memory and simple I/O subsystems.	**S1**	Lectures Labs	**Direct** Quizzes/ Homework Exams **Indirect** Course Exit Survey
3.0	**Values, autonomy, and responsibility**			
3.1				
3.2				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to the microprocessors and microcomputer-based systems; families, types, and characteristics.	**3**
2.	The microprocessor and its architecture Internal Architecture, Real mode memory addressing.	**3**
3.	Addressing modes Data addressing modes, program memory addressing modes, stack memory addressing modes.	**6**
4.	Data movement instructions MOV, PUSH/POP, Load Effective Address. Data movement instructions String Data Transfers, Misc. Data Transfers Instructions, Assembler details	**6**
5.	Arithmetic and logic instructions Addition, subtraction and comparison, multiplication and division, BCD and ASCII arithmetic, basic logic instruction, shift and rotate instructions, string comparison.	**3**
6.	Program control instructions, the Jump group, controlling the flow of assembly language program, procedures.	**3**
7.	Introduction to interrupts, interrupt processing, hardware and software interrupts, programmable interrupt Controller.	**3**
8.	Using assembly language with C/C++ for 16bit applications, Separate assembly objects.	**3**
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	HomeWorks /Student Participation-Attendance	Every Week	10%
2.	Quizzes	Week 4 and 12	10%
3.	Mid-Term	Week 7	20%
4.	Lab Score	Week 16	20%
5.	Final Examination	Week 16	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	• "The Intel Microprocessors", Barry B. Brey, 7th Edition 2006, Prentice Hall
Supportive References	• The 80x86 IBM PC and Compatible Computers. "Assembly Language Design & Interfaces", Muhammad Ali Mazidi and Janice Gillispie Mazidi, 3rd Edition 2002 Prentice Hall
Electronic Materials	-
Other Learning Materials	-

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	• Classroom with 30 chairs • Computer Lab with Micro-Processor Emulator
Technology equipment (projector, smart board, software)	• Video projector / data show • White board
Other equipment (depending on the nature of the specialty)	-

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	• Students • Faculty members • Coordinator • Council • Curriculum Committees	• Course exit survey • Feedback from Faculty members • Feedback from Course Coordinator • Feedback from council

Assessment Areas/Issues	Assessor	Assessment Methods
		• Feedback from Curriculum Committees
Effectiveness of Students assessment	• Students • Faculty members • Coordinator • Council • Curriculum Committees	• Course exit survey • Feedback from Faculty members • Feedback from Course Coordinator • Feedback from council • Feedback from Curriculum Committees
Quality of learning resources	• Students • Faculty members • Coordinator • Council • Curriculum Committees	• Course exit survey • Feedback from Faculty members • Feedback from Course Coordinator • Feedback from council • Feedback from Curriculum Committees
The extent to which CLOs have been achieved	• Students • Faculty members • Coordinator • Council • Curriculum Committees	• Course exit survey • Feedback from Faculty members • Feedback from Course Coordinator • Feedback from council • Feedback from Curriculum Committees
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	CS council
REFERENCE NO.	Meeting #11
DATE	07/03/2024