

<b>Course Title</b>	$\mu$ P Interfacing and Programming	<b>Course Code</b>	EE3002
<b>Department</b>	Department of Electrical Engineering (DEE)	<b>Campus</b>	Lahore
<b>Knowledge Profile</b>	Engineering Practice (WK6)	<b>Credit Hrs.</b>	3+1
<b>Knowledge Area</b>	Computer Engineering (KA01)	<b>Grading Scheme</b>	Relative
<b>HEC Knowledge Area</b>	Depth Electives	<b>Applicable From</b>	Fall 2025
<b>SDG</b>	9   Industry, Innovation and Infrastructure	<b>PBL</b>	1
<b>Pre-requisite(s)</b>	EE/EL1005 Digital Logic Design		

<b>Course Objective</b>	The course introduces the architecture, programming, and interfacing of microprocessor/microcontroller-based systems. A portion of this course comprises of assembly/C language programming to understand the relation of software and hardware in microprocessor/microcontroller-based systems. At the end of the course the student should be able to utilize a set of concepts common to design and implement stand-alone microcontroller-based systems which includes design, analysis of design, development of software and hardware required, and testing of the system using different available tools.
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No.	Assigned Program Learning Outcome (PLO)
1	An ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
3	An ability to design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

A = Assignment, Q = Quiz, M = Midterm, F=Final

No.	Course Learning Outcome (CLO) Statements	Assessment Tools	Taxonomy Levels	PLO
1	<b>Describe</b> the internal architecture, programming of microprocessor and microcontroller.	A1, Q1, M1	C2	1
2	<b>Develop</b> a program to interface various peripherals with pins and ports of microcontroller.	A2, Q2, M2	C6	3
3	<b>Construct</b> a program to interface a microcontroller with external and internal components.	Q3, M2, F	C6	3
4	<b>Design</b> a system using micro-processor and micro-controller.	Q4, A3, F	C6	3

<b>Text Books</b>	<b>Title</b>	PIC Microcontroller and embedded systems (2nd Edition)
	<b>Author</b>	Muhammad Ali Mazidi
	<b>Publisher</b>	Pearson; 2nd edition
<b>Reference Books</b>	<b>Title</b>	Microprocessors and Interfacing
	<b>Author</b>	Douglas V. Hall
	<b>Publisher</b>	McGraw-Hill, 2006, 2nd Edition, ISBN 0-07-060167-4
	<b>Title</b>	The PIC microcontrollers
	<b>Author</b>	Nebojsa Matic
	<b>Publisher</b>	mikroElektronika, 2003 (Free Available Online)

Week	Course Contents/Topics	Chapter	CLO
01	Introduction to computing, Introduction to microprocessor, Internal Architecture of microprocessor, Address and data bus, Basic Components of microprocessor (CPU), Overview of the PIC18 family	0, 1	1
02	The WREG register in the PIC, The PIC file register, Using instructions with the default access bank	2	1, 2
03	PIC status register, PIC data format and directives, Assembly language programming of PIC, Assembling and linking a PIC program, The Program counter and program ROM space in the PIC	2	1
04	Branch instructions and looping, call instructions and stack	3	1
05-06	PIC 18 time delay and instruction pipeline, I/O Port Programming in PIC18, I/O bit manipulation programming	3, 4	1
07	Arithmetic instructions, Signed number concepts	5	1
08	Logic and compare instructions, rotate instruction, Data serialization, BCD and ASCII conversion	5	1
09	Immediate, Direct, Register Indirect addressing modes, Look-up table and table processing	6	1
10	Bit addressability, Bank switching in the PIC18, MACROS and Modules	6	2
11	Data types, Time Delay, I/O Programming, Logic Operations in C, Data conversion programs in C, Data serialization in C	7	1,2
12 – 13	Programming Timers 0 and 1, Counter Programming, Basics of serial communication, PIC18 serial port programming in Assembly and C	9, 10	3
14 – 15	PIC18 interrupts, Programming timer interrupts, Programming external hardware interrupts, LCD, Motor and Keypad Interfacing	11, 12, 13, 17	3
16	Writing mix Assembly and C code and Project Building using PIC microcontroller		4

Assessment Tools	Weightage
Quizzes, Assignments*	20%
Midterm (I+II)	15+15 = 30%
Final Exam	50%

\*Assignments/Quiz will also comprise of a final hardware based project