UNIVERSITI TEKNOLOGI MARA

ECE627: MICROCONTROLLER APPLICATIONS

Course Name (English)	MICROCONTROLLER APPLICATIONS `APPROVED`
Course Code	ECE627

MQF Credit	3

Course Description	This course briefly introduces the theory of microcontroller (currently based on PIC16F877a). It also covers design, development and testing of microcontroller-based project.

Transferable Skills	Ability to design microcomputer-based system.

Teaching Methodologies	Lectures, Lab Work, Practical Classes

CLO		
	CLO1	Describe microcontroller system and memory proficiently.
	CLO2	Design and develop simple interfacing or driver circuit based on given specifications.
	CLO3	Construct a module to test and debug hardware and software elements based on microcontroller.

Pre-Requisite Courses	No course recommendations

Topics

1. Introduction to Microcontrollers
1.1) Stored program concept vs hardwired concept
1.2) Basic microcontroller organisation
1.3) Various types of microcontrollers

2. Microcontroller Architecture
2.1) Organisation of memory registers
2.2) SFR and working registers
2.3) Machine instruction cycle

3. Microcontroller Memory Registers
3.1) Program and data memories
3.2) GPR
3.3) Reset and Interrupt Vector
3.4) Types of memory
3.5) Concept of bank/page and methods of changing bank/page

4. The Instruction Set and Addressing Modes
4.1) Instruction and data flow
4.2) Classes of instruction
4.3) Instruction set
4.4) Types of addressing modes

5. Input/Output Techniques
5.1) Digital and Analogue Interfacing
5.2) Interfacing concepts: serial and parallel input/output
5.3) Driver circuit for relay, LED and seven-segment display
5.4) Interrupt and Watchdog programming, and Sleep mode

6. Design Examples
6.1) Design controller for AC/DC, AC/AC, DC/DC and DC/AC converters
6.2) PWM signal generation
6.3) Analogue signal input
6.4) Motor speed controllers

Assessment Breakdown	%
Continuous Assessment	100.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Group Project	Mini Project. Group of 4	30%	CLO3
	Quiz	n/a	5%	CLO1
	Quiz	n/a	5%	CLO2
	Test	Test 2	10%	CLO1
	Test	Test 2	10%	CLO2
	Test	Test 1	15%	CLO2
	Test	Test 1	25%	CLO1

Reading List	Reference Book Resources	• **Dogan Ibrahim 2014**, *PIC Microcontroller Projects in C, Second Edition: Basic to Advanced*, **Second Ed., Newnes [ISBN: 978-008099924]** • **Fernando E. Valdes-Perez, Ramon Pallas-Areny 2009,** *Microcontrollers - Fundamentals and Applications with PIC*, **CRC Press** • **Microchip 2003**, *PIC16F87XA Data Sheet*
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	