



Jordan University of Science and Technology
Faculty of Engineering
Electrical Engineering Department

EE472 Microcontrollers And Embedded Systems Lab

Summer Semester 2019-2020

Course Catalog

1 Credit Hours. (Pre-requisite: CPE 235 or EE 272, EE 324, Co. EE 470) Basic experiments on using Microcontrollers PIC18F4520 to interface LEDs, switches, keypads, LCDs, temperature sensors using the internal ports in assembly and C languages. Experiments on using the built-in timers, A/D converter, USART, I²C and SPI busses. A final individual design project will be carried out by students including analysis of the problem, design of the system hardware and software, simulation and implementation.

Text Book

Title	PIC Microcontroller and Embedded Systems C for PIC18, Prentice-Hall, 2008.
Author(s)	Mazidi, M., McKinlay, R., and Causey, D.,
Edition	1st Edition
Short Name	Text Book
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref1	Microprocessors from Assembly Language to C using the PIC18Fxx2	Reese, R. B.	1st Edition	

Instructor

Name	Eng. Rana Maiaah
Office Location	-
Office Hours	
Email	rbmaiaah@just.edu.jo

Class Schedule & Room

Section 1:
 Lecture Time: Sat, Thu : 08:30 - 11:30
 Room: LAB

Prerequisites

Line Number	Course Name	Prerequisite Type
1712351	CPE235 Digital Logic Design Lab	Prerequisite / Study
243242	EE324 Electronic Circuits Lab	Prerequisite / Study

Tentative List of Topics Covered

Weeks	Topic	References
Week 1	Introduction and familiarization to the Lab tools LED-Switch.	plus handouts From Text Book
Week 2	Count switch pressings and display on common cathode 7 segment display.	plus handouts From Text Book
Week 3	pulses and square waves using Delay routines	plus handouts From Text Book
Week 4	Using Timer1 to generate square waves and measure pulse width.	plus handouts From Text Book
Week 5	Generate several square waves via the timers. Measure the frequency of a square wave by entering the signal as external input to timer 1. Serialization of the data.	plus handouts From Text Book
Week 6	Capture pulse width, compare to generate square wave and PWM to generate variable duty cycle periodic pulse.	plus handouts From Text Book
Week 7	Interrupts: INT0, INT1, INT2 (edge triggered), and RB (level). Square wave generation via timer 1 and interrupt from CCPx in compare mode.	plus handouts From Text Book
Week 8	LDR, LCD, and Keypad interfacing.	plus handouts From Text Book
Week 9	ADC, LM35 temperature measurement. DAC using R-2R network. Function generator.	plus handouts From Text Book
Week 10	Serial asynchronous communications using USART also using software emulation to connect the PIC to the virtual terminal or the PC.	plus handouts From Text Book

Week 11	Using the built-in voltage comparator to compare two analog values. Using the ADC to build a resistance or capacitance meter.	plus handouts From Text Book
Weeks 12, 13, 14, 15, 16	Final Project	plus handouts From Text Book

Mapping of Course Outcomes to Program Student Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
demonstrate a working knowledge of microcontroller busses and the flow of data within a microcontroller system.[10%	
develop and demonstrate how to accomplish a given task using Assembly and ? C? language on a microcontroller	40%	
demonstrate a working knowledge of the necessary steps and methods used to interface a microcontroller system to devices such as motors, sensors, etc.	20%	
demonstrate the use of interrupts and other advanced concepts related to microcontrollers	10%	
complete the design, development, programming, and testing of a PIC microcontroller-based embedded system	20%	

Relationship to Program Student Outcomes (Out of 100%)						
ABET1	ABET2	ABET3	ABET4	ABET5	ABET6	ABET7

Evaluation	
Assessment Tool	Weight
Midterm Exam, mid project, quizzes, experiments	50%
Final Exam and Final Project	50%

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