

**CLASS: Microcontroller Systems and Interfacing ELEC 74**

<b><u>INSTRUCTOR:</u></b>	Jacob Christ <a href="mailto:jacob@pontech.com">jacob@pontech.com</a> 714-269-7256 Cell (Call or Text okay)
<b><u>OFFICE-HOURS:</u></b>	7:00am – 8:00am in 28B-403, or by arrangement + I usually stay 30min after class.
<b><u>CLASSROOM / TIME:</u></b>	28B – 403, Th, 08:00am – 11:10am, 11:30am - 02:40pm
<b><u>CLASS WEBSITE:</u></b>	<a href="http://0process.com/mtsac/elec74/2020-spring/">http://0process.com/mtsac/elec74/2020-spring/</a>
<b><u>COURSE DESCRIPTION:</u></b>	This course emphasizes the software and hardware architecture for the Wiring Embedded API as implemented in a PIC Microcontroller environment. The software tools and hardware interface circuit design are covered for the microcontroller. Fundamentals circuits and terms are covered lectures and laboratory experiments by programming and interfacing to common circuits use in industry today.
<b><u>MEASURABLE OUTCOMES:</u></b>	Course measurable outcomes information can be obtained for this and all other Mt. SAC credit courses by visiting <a href="http://webcms.mtsac.edu">webcms.mtsac.edu</a> , selecting the “Public Access” option, and using the pull-down menus to select the desired course.
<b><u>PREREQUISITES:</u></b>	ELEC 56 (Advisory)
<b><u>CO-REQUISITES:</u></b>	None
<b><u>COURSE OBJECTIVES:</u></b>	<ol style="list-style-type: none"><li>1. Program a PIC microcontroller using a development board.</li><li>2. Compare and contrast various features of different process control circuits.</li><li>3. Demonstrate the use of interfacing devices in circuit operation.</li><li>4. Compare and contrast various features of different interfacing devices.</li><li>5. Program the PIC using the C programming language.</li><li>6. Demonstrate a functional interface control circuit for a process control circuit.</li><li>7. Compare and contrast features of various types of PLDs.</li></ol>
<b><u>REQUIRED MATERIALS:</u></b>	Electronics 74 Instruction Notes and Lab Manual; Christ, Skoczen, Tsai, (and others) Microchip PIC32 Family Manual (and others) / Flash Drive One of the following two parts kits: MtSAC ELEC 74 Fubarino SD Development Kit (P/N: PLPA-0058-REV-D) MtSAC ELEC 74 Fubarino Mini Development Kit (P/N: PLPA-0176-REV-A)
<b><u>OPTIONAL MATERIALS:</u></b>	Arduino Cookbook by: Margolis, Michael
<b><u>ATTENDANCE:</u></b>	PER COLLEGE POLICY; IN THIS CLASS, THE STUDENT WILL BE DROPPED AFTER THE 3rd UNEXCUSED ABSENCE
<b><u>METHOD OF EVALUATION:</u></b>	50% - Labs (10 labs 5.0% each) 10% - 2 Projects, 5% each 20% - Mid Term (Written + Lab) 20% - FINAL EXAM (Written + Lab, Comprehensive) 100% (total)
<b><u>GRADING SYSTEM:</u></b>	Semester grade will be based upon student’s percentage of points earned out of total possible points. Refer to scale below: A = [90% - 100%],      B = [80%-90%) C = [60% - 80%),      D = [50%-60%) F = [0%-50%)

**STUDEN LEARNING OUTCOMES (SLO's):**

Students completing ELEC 74 will be able to describe the relationship between hardware and software in a microcontroller. Students completing ELEC 74 will be able to install programs and development tools into microcontrollers or companion personal computers. Students in ELEC 74 will use different types of microcontroller platforms (such as Arduino or Fubarino) to implement projects of their own design.

*A complete list SLO's for the electronics department can be found here:*

Location	Week	Day	Topic (actual)	Lab
MtSAC	0x01	28-Feb	The Microcontroller and C Programming	
MtSAC	0x01	28-Feb	Installing and Using Development Tools	1
MtSAC	0x02	6-Mar	Bits, Bytes & Data Types, Functions and Loops	
MtSAC	0x02	6-Mar	Powering the Fubarino, Intro to Serial, Functions and Variables	2
MtSAC	0x03	13-Mar	Arrays, if-else, conditional, bitwise & logical operators, truth values	
MtSAC	0x03	13-Mar	Digital Input - Conditional Statements	3
N/A	0x04	20-Mar	Shutdown	
N/A	0x04	20-Mar	Shutdown	
N/A	0x05	27-Mar	Shutdown	
N/A	0x05	27-Mar	Shutdown	
Zoom	0x06	3-Apr	Asynchronous Serial Communications	
Zoom	0x06	3-Apr	Asynchronous Serial Communications	4
Zoom	0x07	10-Apr	String Parsing	
Zoom	0x07	10-Apr	Serial Parser, String Manipulation & Libraries	5
Zoom	0x08	17-Apr	Strings and Pointers	
Zoom	0x08	17-Apr	Strings and Pointers (Lab 5 Continued)	5
Zoom	0x09	24-Apr	ADC / Interfacing with analog electronic devices	
Zoom	0x09	24-Apr	ADC / Interfacing with analog electronic devices	6
Zoom	0x0A	1-May	Midterm Review / Lab Makeup	
Zoom	0x0A	1-May	Midterm 1 / Project Proposal Due	
Zoom	0x0B	8-May	Introduction to SPI /Digital Analog Converter	
Zoom	0x0B	8-May	Introduction to SPI /Digital Analog Converter *** DEMO ***	7
Zoom	0x0C	15-May	Introduction to C++	
Zoom	0x0C	15-May	Contributed Libraries and Custom Libraries	8
Zoom	0x0D	22-May	Interfacing to SD Cards / USB Mouse / USB Keyboard	
Zoom	0x0D	22-May	USB Lab (Lab9)	9
Zoom	0x0E	29-May	Introduction to SPI/ LCD Display and Internal EEPROM	
Zoom	0x0E	29-May	Introduction to SPI/ LCD Display and Internal EEPROM *** DEMO	10
Zoom	0x0F	5-Jun	Projects Due / Demonstrations	
Zoom	0x0F	5-Jun	Projects Due / Demonstrations	
Zoom	0x10	12-Jun	Final Exam (7:30am - 10am, anytime if on-line )	

Finals Week: June 8-12, 2020 (2020 Spring Final Exam Schedule)

<https://www.mtsac.edu/schedule/finals/>

TESTS WILL BE ANNOUNCED AT LEAST 1 WEEK IN ADVANCE ANY MISSED TEST MUST BE MADE UP BEFORE THE NEXT CLASS MEETING. QUIZZES ARE UNANNOUNCED AND MAY BE MADE UP WITH HALF CREDIT. THE ABOVE SCHEDULE IS NOTICE FOR THE TESTS, IF A TEST MOVES IT WILL BE ANNOUNCED AT LEAST ONE WEEK PRIOR ORIGINAL DATE AND ONE WEEK PRIOR TO NEW DATE.