IMPERIAL VALLEY COLLEGE

Basic Course Information

Semester:	**Spring 2021**	Instructor Name:	Ricardo Jimenez, MSEE
Course Title & #:	**Assembly Lang and Machine Org**	Email:	ricardo.jimenez@imperial.edu
CRN #:	21738	Webpage:	https://www.facebook.com/groups/2021cs281
Classroom:	On line	Office #:	3110
Class Dates:		Office Hours:	
Class Days:		Office Phone #:	
Class Times:	Asynchronous on Canvas/YouTube	Emergency Contact:	
Units:	3	Class Format:	On line

Course Description

Basics of machine architecture, machine language, assembly language and operating systems. Representation of data types and structures along with instruction representation and execution, addressing modes, subroutine calls, and return mechanisms (LIFO mem), fixed point systems, and basic organization of the Harvard and Von Neumann machines are included. (C-ID COMP 142) (CSU/UC).

Course Prerequisite(s) and/or Corequisite(s)

A. CS220 or
CS221 and
MATH 091 or
MATH 098 With a grade of C or better, or appropriate placement as defined by AB 705.
B. COREQUISITES, IF ANY:
C. RECOMMENDED PREPARATION, IF ANY:

Student Learning Outcomes

Upon course completion, the successful student will have acquired new skills, knowledge, and or attitudes as demonstrated by being able to:

1. *Describe the internal architecture of Microprocessors and Microcontrollers.*
2. *Describe how data is represented and transferred in computer memory*
3. *Show how fundamental Macroinstructions are implemented at the machine language level*
4. *Write Assembly language program algorithm*

Course Objectives

Measurable Course objectives and minimum standard for a grade of C:
Upon satisfactory completion of the course, students will be able to:

1. Describe how data are represented in a computer, including floating point numbers and arrays.
2. Code, execute and debug assembly language programs
3. Demonstrate an understanding of computer architecture
4. Demonstrate the function CPU registers
5. Use correct addressing modes and terminology
6. Use integer arithmetic instructions
7. Correctly use repetition constructs, macros and procedures in assembly language

8. Program keyboard input and text screen output
9. Use machine instructions involving data structure stacks to code selected algorithms
10. Write code for interrupt handler.

Core Content to be covered in all sections

Lecture Outline

1. Computer Architecture
   a) Central processor registers
   b) Communications with memory
   c) Instruction format and execution cycles
2. Addressing Techniques
   a) Absolute, relative, indirect and indexed addressing
3. Representation of data
   b) Base arithmetic and conversion
   c) Bytes and word size
   d) Character strings and arrays
   e) Floating point numbers
4. Assembly Language fundamentals
   a) Format, terminology and operands
   b) Process and production
   c) Pseudo-ops
   d) Instruction format
   e) Registers and moving data
   f) Logical machine instructions
   g) Keyboard input/output to displays
   h) Branch, jump, and loop instructions
   i) Index registers instructions
5. Advanced Assembly instruction
   a) Parameter passing
   b) Macros
   c) Interrupt
   d) Writing an interrupt handler
   e) Using a co-processor
   f) Advanced use of segments and segments registers

Textbooks & Other Resources or Links

1. *Microcontrollers, Fundamentals and Applications with PIC, Ramon Pallas and Fernando Valdes. CRC Press. ISBN:978-1-420077674. www.crcpress.com.*
2. *The PIC Microcontroller Engineer's Notebook. Ricardo Jimenez, 2019. 89 pages. World Class Micro Eltrn. Available at amazon.com, ISBN:978-1-7325906-01.*
3. *Supplement book: Horstmann, C., 2018. Big Java, Early Objects 7th Ed.,Wiley ISBN:978-1-119-49909-1*
4. *Links to my published articles about microcontrollers in electronicdesign.com magazine: https://www.electronicdesign.com/search?ebm_electronicdesign%5Bquery%5D=Ricardo%20Jimenez&ebm_electronicdesign%5BsortBy%5D=ebm_electronicdesign_published*
5. *For details about algorithms join the group: https://www.facebook.com/groups/2021cs281*
6. *Link for the Compiler manual: https://melabs.com/downloads/PBP_Manual_0609_260.pdf*

7. *Link for the free software download: https://store.melabs.com/merchant.mvc?Session_ID=0fcd02e7f7e82cd935eeebcb09d44a9c&Screen=PROD&Store_Code=melabs&Product_Code=PBP3-2&Category_Code=*
8. *Starting on Feb/08, you can access my playlist CS281 Assembly Language IVC on my YouTube channel Rick Jimenez.*

Course Requirements and Instructional Methods

Assignments are designed to elicit your demonstration of critical thinking, understanding and application of the course concepts, and your proficiency in the subject matter.

Required Activities or Assignments Points

1. Homework, Assignments: 20
2. Laboratory Reports: 25
3. Mid-Term Exam: 25
4. Final Exam: 30

Teaching Methods: Discussion of assignments and instructional methods will be a combination of all methods of instruction, which can be classified as telling, lecturing, or discussing; showing or demonstrating.

Out of Class Assignments: The Department of Education policy states that one (1) credit hour is the amount of student work that reasonably approximates not less than one hour of class time and two (2) hours of out-of-class time per week over the span of a semester. WASC has adopted a similar requirement.

Course Grading Based on Course Objectives

The course grade is based on total points accumulated during the semester. There is a maximum of 100 points. Very limited extra credit points may be available, either through some class participation activity, group work or perfect attendance. Failing to turn in regular assignments will stop you from being able to earn extra credit points and late assignments will have points subtracted.

Final Grades are calculated as follows:

Points	Grade
90-100	A
80-89	B
70-79	C
60-69	D
Below 60	F

Grading Rubrics: In addition to the percentages and points listed above the following grading rubric (standards expected) will be used when grading student assignments. The description that best fits your work will be the assigned grade.

Grade	Rubric or Standard Expected
A	Focused and clearly organized. Contains advanced critical thinking and analysis. Convincing evidence is provided to support conclusions. Clearly meets or exceeds assignment requirements.
B	Generally focused with some development of ideas, but may be simplistic or repetitive. Evidence is provided to support conclusions. Occasional grammatical errors. Meets assignment requirements, but does not exceed.
C	Unfocused, underdeveloped, or rambling, but has some coherence. Minimal evidence is provided to support conclusions. Several grammatical errors. Meets minimum assignment requirements.
D	Unfocused, underdeveloped, and/or rambling. Limited evidence is used to support conclusions. Serious grammatical errors that impede overall understanding. Does not address the assignment requirements
F	Unfocused, underdeveloped, and/or rambling. Incomplete or too brief. No evidence is used to support conclusions. Serious grammatical errors that block overall understanding. Does not meet assignment requirements. Minimal to no student effort.

Late Assignments will be accepted until the graded assignment is returned to the class, but assessed a penalty of 10 points per calendar day it is late.

Course Policies

- A student who fails to attend the first meeting of a class or does not complete the first mandatory activity of an online class will be dropped by the instructor as of the first official meeting of that class. Should readmission be desired, the student's status will be the same as that of any other student who desires to add a class. It is the student's responsibility to drop or officially withdraw from the class. See General Catalog for details.
- Regular attendance in all classes is expected of all students. A student whose continuous, unexcused absences exceed the number of hours the class is scheduled to meet per week may be dropped. For online courses, students who fail to complete required activities for two consecutive weeks may be considered to have excessive absences and may be dropped.
- Absences attributed to the representation of the college at officially approved events (conferences, contests, and field trips) will be counted as 'excused' absences.
- Electronic Devices: Cell phones and electronic devices must be turned off and put away during class/zoom, unless otherwise directed by the instructor.
- Food and Drink are prohibited in all classrooms. Water bottles with lids/caps are the only exception. Additional restrictions will apply in labs. Please comply as directed by the instructor.
- Disruptive Students: Students who disrupt or interfere with a class may be sent out of the room and told to meet with the Campus Disciplinary Officer before returning to continue with coursework. Disciplinary procedures will be followed as outlined in the General Catalog.
- Children in the classroom: Due to college rules and state laws, only students enrolled in the class may attend; children are not allowed.

Other Course Information

Classes will be asynchronous, twice a week. The links to these video lectures will be posted on Canvas.

Students will be receive a Microcontroller programmed with 12 practices ready to be tested at home. In addition, a Protoboard with accessories will be provided on a date assigned by the instructor.

IVC Student Resources

IVC wants you to be successful in all aspects of your education. For help, resources, services, and an explanation of policies, visit http://www.imperial.edu/studentresources or click the heart icon in Canvas.

Anticipated Class Schedule/Calendar

Date or Week	Activity, Assignment, and/or Topic	Pages/ Due Dates/Tests
Week 1 Feb 16 - 19	Syllabus & Introduction Introduction to numbers, systems, and Logic gates	
Week 2 Feb 22 - 26	Introduction to Computer Architectures Harvard and Von Neumann Flip Flops, Flags, and data registers	
Week 3 March 1-5	Shift Registers and Counters in CPUs Arithmetic Logic units (ALUs)	
Week 4 March 8-12	Memory Technologies and addressing modes RAM, Flash, HEF, and LIFO.	
Week 5 March 15-19	Introduction to Microsequencers Machine Language, cycles and micro cycles, pipeline registers.	
Week 6	Introduction to Microcontrollers	

Date or Week	Activity, Assignment, and/or Topic	Pages/ Due Dates/Tests
March 22-26	Architecture and Instruction Set	
Week 7 March 29-Apr 2	Bit Oriented instructions Code for bit oriented instructions	
Week 8 April 12-16	Byte oriented instructions Data transfer and comparison techniques	
Week 9 April 19-23	Using Integer Arithmetic instructions Conditional loop and nested instructions	
Week 10 April 16-29	Program keyboard input and text screen output Interrupt handling	
Week 11 May 3-7	Use machine instructions involving stacks to code selected algorithms Programming internal Timers and Counters	
Week 12 May 10-14	Design and test code for real world basic applications	
Week 13 May 17-21	Design and test code for intermediate applications	
Week 14 May 24-28	Design and test code for advanced wireless applications	
Week 15 June 1-5	Final Test	

*****Subject to change without prior notice*****