

Class meets MW 5:45-7:00pm in ENGR 1.268

Lab meets W 1:45-4:35pm or T 2:35-5:25pm in ENGR 2.238

Professor: Junfei Li

Office hours: MW 4:30pm-5:30pm

Office: ENGR 3.274

F 11:30am-12:30pm

Phone: 316-7148

other time by appointment

E-mail: fei@panam.edu

Course website: <http://onlinelearning.panam.edu> accessible with WebCT account

Lab Assistant: Jorge Suarez, jsuarez@panam.edu Office hours: T 2:00pm-2:30pm

Prerequisite: EE 2230 Digital Systems Engineering and CSCI 1380 Programming

Course objective: To gain the necessary skills of using and building embedded microprocessor-based systems, including

1. Microprocessor architecture
2. Assembly language programming
3. I/O interfacing.

Textbook: W. A. Triebel and A. Singh, *The 8088 and 8086 Microprocessors*, 4th edition, Prentice Hall, 2003, ISBN 013-093081-4

Reference: Douglas V. Hall, *Microprocessors and Interfacing*, Glencoe-McGraw Hill, 2nd edition, 1992.

Online text: <http://webster.cs.ucr.edu/> *Art of Assembly Language Programming*

Software: Turbo Assembler 5.0 / Turbo Debugger 5.0 / MS DOS Debug

Hardware: Intel SDK-86 board

Covered topics:

1. Introduction to Microprocessors and Microcomputers (Ch 1)
2. 8086 Software Architecture (Ch 2)
3. 8086 Assembly Language Programming (Ch 3-4)
4. 8086 Instructions (Ch 5-7)
5. Procedures and Software Interrupts (Ch 6, Ch 11)
6. An Example 8086-Based System-the SDK-86 (Notes)
7. Parallel I/O with the 8255A Chip (Ch 10)
8. Keyboard Input and Display Output (Ch 10, Notes)
9. Hardware Interrupts (Ch 11, Notes)
10. Serial I/O with the 8251A Chip (Ch 10, Notes)

ADA Statements:

If you have a documented disability which will make it difficult for you to carry out the work as I have outlined and/or if you need special accommodations/assistance due to the disability, please contact the Office of Services for Persons with Disabilities (OSPD), Emilia Ramirez-Schunior Hall Rm.100 immediately. Appropriate arrangements / accommodations can be arranged.

Class Policies

Grading:	Lab	25%	Due one to three weeks later
	Homework	15%	Due the following Wed before class
	Quiz	10%	Unannounced
	Midterm	30%	Mon Oct. 6 & Mon Nov. 17
	<u>Final</u>	<u>20%</u>	<u>Wed December 10</u>
	Total	100%	

A=85-100, B=75-84, C=65-74, D=50-64, F=0-49

1. You will be responsible for tasks posted on the course website as well as work assigned during class.
2. Every lab work needs a demo to the lab assistant to earn a credit.
3. Programs would be graded on styles as well as correctness.
4. Any re-grading request must be submitted within three days.

Collaboration:

1. Class partnership will be assigned during the first class week in the form of four students per group.
2. Only one submission for each group is needed for lab report, homework and quiz.
3. Collaboration on coursework is encouraged.
4. The best team player will be rewarded with 5% bonus points at the recommendation of the team before each exam.

Late work:

1. Homework is usually due next Wednesday before class following the assignment.
2. Lab might have up to three weeks duration.
3. Specific due dates will be posted on the course website.
4. Late assignments are subject to 20% penalty.
5. For partial credit, late assignments must be turned in within one week of the original due date.
6. Turn in any late lab report or homework directly to the lab assistant. Or you can drop it in the instructor's mailbox in ENS 3.235.
7. No credit will be given after solutions are posted on the website.
8. No make-up for any missed exam, quiz, homework or lab will be permitted unless arranged in advance.

Attendance:

1. Attendance and active class participation are expected.
2. Good attendance will be rewarded as part of the quiz points.
3. Students with 5 plus absences are to be dropped by the instructor.

Suggestions:

1. Always ask questions if you do not understand something during the class. There is no such thing as a stupid question.
2. Always seek assistance if necessary. Available resources include fellow students, lab assistant, instructor, course website, textbook, google.com, etc.
3. Always be generous to help other students. The best way of learning is teaching.

Tentative Lecture Schedule

Date	Topic	Out	In
8/25 Mon	Syllabus		
8/27 Wed	1.1-1.6	HW1 Prob. 1.40, 1.42, 1.47, 1.48, 1.51, 1.11, 1.18	
9/1 Mon	Holiday-No Class		
9/3 Wed	2.1-2.4	HW2 Prob. 2.10, 2.16, 2.18, 2.21, 2.24	HW1
9/8 Mon	2.5-2.10	HW3A Prob. 2.25, 2.34, 2.37, 2.39, 2.43, 2.44, 2.48	
9/10 Wed	2.11	HW3B Prob. 2.54, 2.55, 2.56, 2.57, 2.58	HW2
9/15 Mon	2.12-2.13	HW4A Prob. 2.61, 2.62, 2.63, 2.65	
9/17 Wed	3.1-3.2	HW4B Prob. 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.13, 3.22	HW3
9/22 Mon	3.3	HW5A Prob. 3.24, 3.25	
9/24 Wed	3.4	HW5B Prob. 3.26	HW4
9/29 Mon	3.5	HW6 Prob. 3.27, 3.28, 3.29, 3.30, 3.31, 3.32	
10/1 Wed	Review		HW5
10/6 Mon	Mid-Exam # 1		HW6
10/8 Wed	5.1-5.2	HW7 Prob. 5.1, 5.4, 5.8, 5.10, 5.12, 5.16, 5.18	
10/13 Mon	5.3-5.5	HW8A Prob. 5.26, 5.27, 5.31, 5.33, 5.35, 5.36, 5.38, 5.42, 5.47, 5.53	
10/15 Wed	6.1-6.3	HW8B Prob. 6.4, 6.5, 6.8, 6.9, 6.10, 6.12, 6.15, 6.21, 6.22, 6.23	HW7
10/20 Mon	6.5	HW9A Prob. 6.38, 6.39, 6.40	
10/22 Wed	6.4	HW9B Prob. 6.25, 6.29, 6.31, 6.32, 6.34	HW8
10/27 Mon	11.1-11.3	HW10A Prob. 11.3, 11.4, 11.7, 11.8, 11.10, 11.2, 11.13	
10/29 Wed	11.9	HW10B Prob. 11.39, 11.40	HW9
11/3 Mon	8086 System		
11/5 Wed	Memory		HW10
11/10 Mon	Parallel I/O		
11/12 Wed	Review		
11/17 Mon	Mid-Exam # 2		
11/19 Wed	Display and Keyboard		
11/24 Mon	Hardware Interrupt		
11/26 Wed	Serial I/O		
12/1 Mon	TBD		
12/3 Wed	TBD		
12/8 Mon	Review		
12/10 Wed	Comprehensive Final Exam		
12/12 Fri	Final Grade Report Due		

1. The two homework assignments with lowest scores will be dropped. Only 8 out of 10 homework will be counted.

Tentative Lab Schedule

Lab No.	Topic	Duration
1	TASM	1 week
2	MS DOS Debug	2 weeks
3	Addition and subtraction	2 weeks
4	Loop and control structure	2 weeks
5	Procedures and Turbo Debugger	2 weeks
6	SDK 86 and Simple I/O	2 weeks
7	Frequency Counter	2 weeks
8	Final Project	3 weeks

1. The lab with lowest score will be dropped. Only 6 out of the first 7 labs are counted.
2. Final project is an optional with 5 to 20 bonus points toward your final grade. It is open problem involving both software and hardware design. You must consult the lab assistant / instructor for project ideas and maximum possible points.