

Michigan Technological University

EE 3170 - Fall 2001

Microprocessors

webpage: http://www.ee.mtu.edu/faculty/btdavis/courses/mtu_ee3170_f01/

Course Description:

Introduces the analysis, design, and application of microprocessor-based digital systems. Topics include microprocessor architecture, instruction sets, pipelining concepts, software design, and input/output principles. Credits: 3.0 Lec-Rec-Lab: (3-0-0) Semesters Offered: Fall Spring Prerequisites: EE 2170

Instructor: Brian T. Davis
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Lectures - EERC 100:

Monday, Wednesday, & Friday : 8am-9am

Office Hours

Monday, Wednesday & Friday : 9:15am-10am
Monday & Wednesday : 1:30pm-2:30pm.

I will be in my office substantially more than the hours listed above. You are welcome to stop by at your convenience, and under most circumstances I will take the time to handle your concern. However, under some situations I may ask that you come back during office hours or mutually agreeable time. Alternatively, Email or Phone ahead to make an appointment during or outside of these times.

Required Text:

Microcomputer Engineering, 2/e Gene H. Miller, Kettering University. Copyright 1999, 544 pp.
ISBN 0-13-895368-6.

Required Software:

TEXaS: Test Execute and Simulate. *Motorola 6805/6808/6811/6812*. Jonathan W. Valvano.

Course Outline:

This course is a co-requisite course for EE3301 (Junior level core lab semester 1), as well as the terminal required Computer Engineering course for Electrical Engineering majors. As such, there are a number of topics which will be covered to facilitate the lab. These topics (68HC11 Operation, Assembly language & I/O) will be frontloaded in the semester (Weeks 1-11), to allow the labs to utilize this knowledge. The required text "Microcomputer Engineering" covers the material required for the Lab, as well as the general and applied usage of microcontrollers, but does not adequately cover all the material which will be covered in this semester course. For this reason later in the semester (Weeks 12-15) supplemental materials will be assigned. These materials will be provided via the course webpage, and will not need to be purchased. The tentative schedule of topics by week is included below. The last few weeks of the

semester will be “high altitude” coverage of Computer Engineering terminology and concepts. This section of the course is designed as just enough information to allow students to understand discussions regarding tradeoffs between various computer system architectural decisions, but not intended to prepare the students to participate in the design process. Those students interested in a more in depth examination of computer architecture are encouraged to enroll in EE3173, EE4271, CS3421 or CS4431

Tentative Lecture Schedule:

The following schedule is tentative. A similar table will appear on the course homepage and will be updated to reflect the actual material covered and assignments. This schedule is intended to provide you with insight into the requirements of EE3170 so that you can plan accordingly.

Week	Topics	References	Assignments
(1) 8/27-8/31	Introduction & Admin Prereq Exam Review Prereq material	Syllabus	8/29 : Exam0
(2) 9/3-9/7 No Monday	Digital Systems (comb vs. seq) FSM - sync vs async Theory of Microprocessors	Mil 1.3 - 1.6	
(3) 9/10-9/14	68HC11 Operation 68HC11 Instruction Set & Addressing modes	Mil 2.1-2.4	
(4) 9/17-9/21	Programming in 68HC11 Assembly The assembly process	Mil 2.5-2.7 Mil 3.1	9/17 : HW # 1
(5) 9/24-9/28	Assembly directives Assembly programming	Mil 3.2-3.5	
(6) 10/1-10/5	Software engineering (assembly nutshell) Instruction set design More 68HC11 instructions	Mil 4 Mil 5.1-5.3	10/1 : HW # 2 10/5 : Exam1
(7) 10/8-10/12	Stack, subroutines, parameters & recursive programming in Assembly language	Mil 5.4-5.9	
(8) 10/15-10/19	Microprocessor -> System hierarchy Functional blocks, memory & interconnect	Mil 6.1-6.4	10/15 : HW # 3
(9) 10/22-10/26	Interrupt systems & state Programming for Interrupt handlers (ISRs)	Mil 6.9-6.13	
(10) 10/29-11/2	68HC11 Configuration & Modes Interrupt vs. Polled I/O	Mil 7.1-7.4	10/29 : HW # 4
(11) 11/5-11/9	68HC11 Specific I/O Hardware Clock, Timers & A/D Review	Mil 7.6-7.9 Mil 7.11-7.12	11/9 : Exam 2
(12) 11/12-11/16	Embedded / Real-Time Operating Systems	Mil 8.1-8.5 [Raymond00]	11/16 : HW # 5
11/19-11/23	THANKSGIVING WEEK		
(13) 11/26-11/30	RISC vs. CISC Microprocessor Functional Units Pipelining	[Patterson85]	
(14) 12/3-12/7	SuperScalar Out-of-Order	[Smith95]	12/3 : HW # 6
(15) 12/10-12/14	Advanced I/O & Busses for MPU CMP & “Super”Computers Review	TBA	
(FE) 12/17-12/21	FINAL EXAM WEEK		Final Exam

Attendance

Attendance will not be taken in this course, however it will count toward the class participation portion of the grade. If you feel that you have a legitimate reason for not attending any course session, please let me know BEFORE the class session, via email, phone, or personal discussion - just about any excuse is likely to be favorably received. If you wait until AFTER the class session to see me about material covered in your absence, or if you fail to see me about a missed class the absence is likely to negatively impact your class participation perception.

Evaluation/Grading

Grading will be subjectively determined based upon a class ranking derived from the course component weightings below. Class participation will count for 5% of the final grade, and I expect students to arrive to class having read the assigned material. Failure to come to class prepared will result in a reduction in the class participation, and likely final grade.

The weighting of class components for final grades are as follows:

Prereq exam	5%
Exams (2)	20% each
Final Exam	25%
Homework	25%
Class Participation	5%

All exams/quizzes will be comprehensive and closed book/notes

Assignment questions & Late assignments

I will answer questions regarding assignments in office, lecture and via the WebCT Forums. I will cease to respond to questions regarding an assignment 24 hours prior to that assignment's due date. i.e. if an assignment is due Monday @ 8am, ask your question PRIOR to Sunday @ 8am or it will not be answered.

Late assignments will be penalized 20% for each M-F weekday that they are late. Exceptions to this rule will only be made for cases brought to the instructor's attention PRIOR to the due date.

Plagiarism and Cheating:

In the context of this class, plagiarism is defined as representing someone else's work as your own. Cheating is defined as violating stated rules for an exam or an assignment. Plagiarized work will receive a grade of F as will any assignment in which cheating occurred. If any student cooperation is allowed this will be explicitly spelled out in class or the assignments, otherwise no working in groups is allowed.