ECE441 – Microcomputers
Course Policies and Syllabus

Instructor
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Textbooks: MC68000 Microprocessor Programmer's Reference Manual

SANPER-1 Lab Manual and Course Notes

MC68000 Educational Computer Board User's Manual

References: Microprocessor System Design - 68000 Hardware, Software and Interfacing by A. Clements

The Motorola MC68000 Microprocessor Family, Assembly Language, Interface Design, and System Design by T.L. Harman and D.T. Hein

Goals: To introduce students to the fundamentals of computer architecture, microprocessors, and hardware design. In particular, this course will teach students skills needed to design, implement, test and troubleshoot microprocessor based hardware and software. Weekly design projects reinforce the concepts taught in the classroom and give students hands on experience.

Prerequisites: ECE 218, ECE 242, CS 350 or CS 470 (Familiarity with digital logic, basic electronics, assembly language programming, and ability to work with assembler and simulator software)

Grading:

Exam #1	**20%**	**(September 23, 11:25am-12:40pm)**
Exam #2	**25%**	**(November 11, 11:25am-12:40pm)**
Final Exam	**35%**	**(December 3, 8:00am-10:00am)**
Labs & Project	**20%**	**(Project: November 25-26)**
Total	**100%**	

Holidays: Labor Day (September 2), Fall Break (October 7), Thanksgiving (November 27-29)

Note: **October 17 (6:25PM-9:05PM) will be lecture for all students. November 6 (before Exam #2) will be practice session. There will be no lecture on November 13.**

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(link will be deleted on **Sept. 2, 2013**) PW: ECE441Fall2013CD

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1. Importance of the microcomputer and recent developments in microprocessor design (3 classes)
2. MC68000 Architecture, pin functions, instructions and addressing (3 classes)
3. Interrupt handling, exception processing, and function controls (6 classes)
4. Timing of address, data and control signals (3 classes)
5. Memory Design (3 classes)
6. Input / Output Design (3 classes)
7. Synchronous bus control signals (3 classes)
8. Design with programmable input/output device (6 classes)
9. Design with Asynchronous programmable input/output device (6 classes)
10. Hardware design for reset, bus timeout logic and interrupts (6 classes)
11. Tests (3 classes)

Computer usage

Students use SANPER-1 Educational Computer Board, MC68000 assembler and simulator software to implement and test their projects.

Laboratory projects

1. Introduction to SANPER-1 Microcomputer architecture and TUTOR Resident Monitor program
2. Tutor command utilization and program development
3. Interrupts and exception processing
4. Code conversion, bit manipulation, and software development
5. Design memory hardware and bus cycle timing
6. Design input/output hardware and interrupt logic
7. Design with the programmable parallel input/output device
8. Design with the programmable asynchronous serial input/output device
9. Design and implement a **monitor software project**

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Course Materials

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	Folder	Folder Content
ECE441 CD	Acrobat Reader	Required for viewing PDF files
	Devices	Datasheets for devices used in the lab experiments • ADC0801 • DAC0808 • Logic Analyzer HP54620 • MC1408 • MC6821 • MC6850 • SN74LS373 • ACIA&PIA (reading material for Experiment 7 & 8)
	Easy68K	Simulation software and tutorial resource (used for your final project)
	Educational Computer Board Manual	All the chapters are included individually. • Overview • Chapter 1 • Chapter 2 • Chapter 3 • Chapter 4 • Chapter 5 • Chapter 6 • Chapter 7 • Chapter 8 • Appendix
	Lab Manuals	Experiments 1 – 10 in PDF • Overview • Experiment 1 (Intro to the SANPER-1 Educational Lab Unit) • Experiment 2 (TUTOR Command and Program Experiment) • Experiment 3 (Exception Processing and System Control) • Experiment 4 (Code Conversion and Bit Manipulation) • Experiment 5 (Memory Design using Static RAM) • Experiment 6 (Input / Output Design) • Experiment 7 (Parallel Interfacing using the PIA) • Experiment 8 (Serial Communication using the ACIA) • Experiment 9 (Digital-to-Analog Conversion) • Experiment 10 (Analog-to-Digital Conversion) • Appendix A • Appendix B • Appendix C • Appendix D
	Manuals	M68K User Manual • M68K_User_Manual • M68K_User_Manual_Addendum • M68K_User_Manual_Addendum_2 M68K Programmer's Reference Manual • M68K_Programmer_Reference_Manual • M68K_Programmer_Reference_Manual_Errata
	Pspice	OrCAD Pspice Student version. Useful for schematics

**** Warning : All manuals are copyrighted**