

## ME 477 Embedded Computing in Mechanical Systems

University of Washington

Winter 2008

Version 1.0

Week	Subject	Suggested Reading †
1	Introduction to Microprocessors & Microcomputing - Number Systems: Binary, Octal, Hexadecimal, Conversions, - Arithmetic - Boolean algebra, Combinational logic - Memory and memory organization: - Physical Types, ROM, RAM, Dynamic, Static <b>laboratory #0 - mechanics of embedded computing</b>	Chapter 1 Chapter 2: thru 2.2  Chapter 9: thru 9.4
2	Interpretation: Numbers, Codes, Instructions-CPU Architecture; - General & M68HC12 - Registers, ALU, Control Unit, Condition Code Register - 68HC12 Mnemonics <b>laboratory #1 - C language &amp; machine language</b>	Chapter 2: thru 2.9 Chapter 3: thru 3.3 Chapter 4: thru 4.4 —skim: thru 4.13
3	Review of C Language Programming - Variables, expressions, control, - Use of emulator with C. <b>laboratory #2 - keypad &amp; LCD primitive functions</b>	Use any C language text as a reference. —skim: thru 4.20
4	- The LCD and keypad hardware. - Data Input/Output: Programmed I/O, Interrupts - 68HC12 & the HC2compact, Survey of I/O Devices <b>laboratory #3 - keypad &amp; LCD low-level interface</b>	Chapter 11: thru 11.3
5	- Instruction Timing - Parallel I/O - Pulse Modulation Techniques <b>laboratory #4 - parallel input/output and control</b>	Chapter 7:
6	- Interrupt Driven I/O . Sources: Internal and External . Priority Resolution <b>laboratory #5 - external interrupts</b>	Chapter 8
7	- Programmable Clocks and Timing - D/A & A/D Conversion - Digital Signal Theory <b>laboratory #6 - D/A conversion and clock interrupts</b>	Chapter 10: thru 10.3 Notes
8	- Serial I/O . Synchronous & Asynchronous <b>laboratory #7 - dc-motor encoding &amp; open-loop control</b>	Notes
9	- Interface Devices . TTL Circuits. high-power switches, stepping Motors <b>laboratory #8 - digital closed-loop control</b>	Notes
10	- Other Processors - Bus Structures	

† Cady, Fredrick M and Sibigtroth, James M. **Software and Hardware Engineering Motorola M68HC12**. Oxford University Press. New York. 2000.