

**EE 354
Syllabus**

**Fall 2017/18
Dr. Blandford**

Web site: <http://csserver.evansville.edu/~blandfor>

Text: Notes on the 8051 from the EECS office.

Reference:

1. Stewart, James W. and Miao, Kai X., The 8051 Microcontroller, Hardware, Software, and Interfacing, 2nd edition, Prentice-Hall, 1999.
2. Schultz, Thomas, C and the 8051, 4th edition, Wood Island Prints, 2008
3. MacKenzie, I. Scott, The 8051 Microcontroller, 3rd ed., Prentice-Hall, 1999.
4. Zhu, Yifeng, Embedded Systems with ARM Cortex-M Microcontrollers in Assembly Language and C, Second Edition, E-Man Press, 2015
5. Yiu, Joseph, The Definitive Guide to the ARM CORTEX M3 and M4 Processors, Elsevier, 2014
6. Seal, David, ARM Architecture Reference Manual, 2nd ed., Addison-Wesley, 2000.

Software:

1. A51 Macro Assembler for the 8051 from Keil Software. Available on selected machines in the lab or you may download a student version from <http://www.keil.com/demo/>. The assembler is part of the C51 C Compiler tools listed below.
2. C51 C Compiler for the 8051 from Keil Software. The professional version is available on selected machines in the lab. Alternatively, you may download the most recent student version from <http://www.keil.com/> choose *Evaluation Software* under downloads and click on *C51 tools*. Fill out the registration form. The demo version includes complete manuals.
3. CA ARM C Compiler for the ARM Cortex M4 microcontroller from Keil Software. You may download the most recent student version from <http://www.keil.com/> choose *Evaluation Software* under downloads and click on *ARM Tools*. Fill out the registration form. The demo version includes manuals.

Hardware:

1. Each student will need a 3-wide solderless breadboard for project construction. These are available through the stockroom or you can use the one that was required for EE 210/215.
2. Printed circuit boards for the Atmel AT89C51CC03 and the ARM Cortex M4 Nucleo Board will be used for projects. The 8051 board is available through the EE Department office and the Discovery board can be purchased online.

There will be 3 hour exams, graded homework projects, and a 2 hour comprehensive final exam. The homework will count 24%, the final will count 22%, and the 3 hour exams will count 18% each. All exams are open book and open notes.

Final Exam is Monday, December 11, 2017 at 11:00am

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Monday	Wednesday	Friday
	Aug. 23 Ch. 1-2M Microcontrollers Intro to the 8051 family	Aug. 25 Ch. 2M 8051 Hardware and architecture
Aug. 28 Ch. 2M 8051 memory, timing, and ports Special function registers	Aug. 30 Ch. 2M 8051 machine code Instruction set summary	Sept. 1 Ch. 2 M + Notes 8051 addressing modes Assembly language programs Keil Development software
Sept. 4 Labor Day	Sept. 6 Ch. 3 and notes Assembly examples	Sept. 8 Ch. 3 and notes Program structure
Sept. 11 Review and examples	Sept. 13 Hour Exam 1	Sept. 15 Review exam <i>Project Introduction</i>
Sept. 18 Ch. 4 M C for the 8051	Sept. 20 Ch. 4 M C for the 8051	Sept. 22 <i>Project Hardware Design</i>
Sept. 25 Ch. 4 M C for the 8051	Sept. 27 Ch. 4 M C for the 8051	Sept. 29 Ch. 2 and Ch. 4 Interrupts on the 8051
Oct. 2 Ch. 4 M Interrupts on the 8051	Oct. 4 Ch. 4 M Timer operation	Oct. 6 <i>Project Software Design</i>
Oct. 9 Fall Break	Oct. 11 Ch. 4 M Timer examples	Oct. 13 Ch. 4 and 5M Serial port operation
Oct. 6 Ch. 5M Hour Exam 2	Oct. 18 Review Exam	Oct. 20 <i>Project Due Date</i>
Oct. 23 Ch.1 N Intro to the ARM architecture <i>Project 2 Introduction</i>	Oct. 25 Ch. 1 N ARM M4 Instruction set	Oct. 27 Ch. 2 N μ Vision IDE
Oct. 30 Ch. 2, 3 and 5 N μ Vision C Compiler In line assembly	Nov. 1 Ch. 4 N General purpose I/O	Nov. 3 Ch. 5 N C Programs and examples
Nov. 6 Ch. 4 N Using timers Intro to interrupts	Nov. 8 Ch. 4 N Timers and interrupts	Nov. 10 Project 2 Status Report (Last day to withdraw with W)
Nov. 13 Ch 4 N A to D and D to A conversion	Nov. 15 Ch 4 N Pulse width modulation	Nov. 17 Ch 5 N Examples in C
Nov. 20 Hour Exam 3	Nov. 22 Thanksgiving Break	Nov. 24 Thanksgiving Break
Nov. 27 Ch. 1 to 5 N Review Exam	Nov. 29 Project 2	Dec. 1 Project 2
Dec. 4 <i>Project 2 Due Date</i>	Dec. 6 Final exam review	

M = The 8051 Microcontroller Class notes.

N = The ARM Cortex M4 Class notes.

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