

ETec374 Course Specifications

Catalog Information

Course Number and Title: ETec374 – Microprocessor Applications with Lab

Credit Hours: 5

Course Description: Upper-division study of microprocessors, support devices, and peripheral equipment and their integration into microcomputer systems. Study of various hardware configurations and interfacing techniques. Application-oriented laboratory experiments and design problems.

Prerequisites: ETEC 274 or CSCI 227, ETEC 373, EET major or written permission.

Prerequisite Outcomes: Introductory level understanding of microprocessor-based systems and assembly language programming. Binary numbers, 2's complement arithmetic

Schedule Information

Quarter: Winter 2007

Meeting Times and Rooms

Days	Times	Instructor	Room(s)
TF	1:00-1:50	Todd Morton	ET333
W	1:00-2:50	Todd Morton	ET333
R	1:00-2:50	Todd Morton	ET340

Lab Fee: \$42.00

Enrollment Limit: 18

Student Resources

Student Syllabus: <http://eet.etec.wvu.edu/etec374/374w07syl.pdf>

Course Website: <http://eet.etec.wvu.edu/etec374/index.html>

Facilities and Materials

Required Text(s): [T1] Embedded Microcontrollers, Todd Morton
[T2] CPU12 Reference Manual, Freescale
[T3] 9S12C128 Data Sheet, Freescale

Lab Equipment: MCU Development Board, Windows PC w/ serial port, Mixed-Signal Oscilloscope, DMM

Software: Metrowerks Codewarrior

Course Outcomes

1. Competency in assembly language programming and programming tools including a programming editor, assembler, and debugger.
2. Understanding of microcomputer system hardware including microcontrollers.
3. Understand and be able to utilize an MPU/MCU programming registers, instructions, and addressing modes.
4. Ability to understand and implement subroutines, interrupts, parameter passing, global and local variables, and position independence. Be able to understand and utilize a prewritten basic I/O library that provides routines for ASCII communications over a serial port to a terminal.
5. Be able to use flow diagrams as part of the program design process and understand hierarchical design and structured programming concepts.
6. Be able to analyze and design real-time programs with hard timing requirements.
7. Basic understanding of multitasking and able to design a simple cooperative kernel.
8. Have a basic understanding of common on-chip resources and their applications including general-purpose I/O, timers, serial ports, and A-to-D converters.
9. Understand the requirements and be able to implement a stand-alone MCU-based design.
10. Understand the importance of coding conventions, software ownership ethics, including plagiarism, licensing, and copyrights.
11. Can produce a well written formal lab report.
12. Understand the need for completing work in a timely manner.

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Courses Contribution to the Program Outcomes

P – Primary to the purpose of the course. Course contains significant instruction and opportunities for practice.

S – Secondary to the purpose of the course. Course contains limited instruction and opportunities for practice.

N – Not a significant part of this course.

Program Outcome		Course Contrib	Applicable Course Outcome(s)
a	An appropriate mastery of the knowledge, techniques, skills and modern tools of their disciplines.	P	1, 2, 3, 4, 5, 6, 7, 8, 9
b	An ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology	S	2, 3, 4, 6, 7, 8, 9
c	An ability to conduct, analyze and interpret experiments and apply experimental results to improve processes	P	1, 3, 4, 5, 6, 7, 8, 9
d	An ability to apply creativity in the design of systems, components or processes appropriate to program objectives	P	1, 4, 5, 6, 7, 8
e	An ability to function effectively on teams,	N	
f	An ability to identify, analyze and solve technical problems	P	1, 3, 4, 5, 6, 7, 8, 9
g	An ability to communicate effectively,	S	1, 10, 11
h	A recognition of the need for, and an ability to engage in lifelong learning	N	
i	An ability to understand professional, ethical and social responsibilities	S	10
j	A respect for diversity and a knowledge of contemporary professional, societal and global issues,	N	
k	A commitment to quality, timeliness, and continuous improvement	S	11, 12
A	The application of circuit analysis and design, computer programming, associated software, analog and digital electronics, and microcomputers to the building, testing, operation, and maintenance of electrical/electronic(s) systems	P	1, 3, 4, 5, 6, 7, 8, 9
B	The applications of physics or chemistry to electrical/electronic(s) circuits in a rigorous mathematical environment at or above the level of algebra and trigonometry	N	
C	The ability to analyze, design, and implement control systems, instrumentation systems, communications systems, computer systems, or power systems	S	1, 3, 4, 5, 6, 7, 8, 9
D	The ability to apply project management techniques to electrical/electronic(s) systems	N	
E	The ability to utilize statistics/probability, transform methods, discrete mathematics, or applied differential equations in support of electrical/electronic(s) systems	N	

Outcome Assessment Tools

1. Embedded Micro Module Senior Survey