

Minnesota State University, Mankato HOLD and CLEAR buttons only compatible with Acrobat V. 4 and 5
Curriculum Proposal

0716
 Revised
 10/27/06

Please type or select the requested information. Print completed forms, add appropriate paper attachments, and route through MSU's curricular process for recommendations and decisions.

(Check all that apply):		Proposal #	324
College: Science, Engineering and Technology	<input checked="" type="checkbox"/> Undergraduate	Effective Date of Change:	
Department: Electrical and Computer Engineering and T	<input type="checkbox"/> Graduate	Academic Year	06-07
Program: Electrical and Computer Engineering	CIP #	(For Office Use Only)	
Type of Change: COURSE PROPOSALS		Course Designator and Number	Number of Credits
Proposed: New Course		EE 235	1
Title Current:		(if applicable)	
Title Proposed: Microprocessor Engineering Laboratory I			
24-Char. Abbrev: Micro Lab I			

Include a course or program description for the Bulletin (30-40 words maximum for courses, 100 for programs):
 Laboratory support for EE234. Use of development boards and assembly language programming to handle interrupts, interface with parallel I/O ports, memory, and timers. Experiments will involve signal and frequency measurements, data conversions, and interface design. Prerequisite: EE 106, EE 107; ~~EE 234~~ and EE 235 taken concurrently.
 CS220

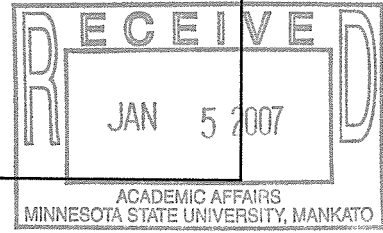
Rationale or Justification for change:
 This course is being added to better align our programs with Community Colleges and to enhance the Computer Engineering curriculum to support accreditation.

For General Education or Cultural Diversity Courses Only

General Education Course: GE Category # GE Category Name (Maximum of 3 Categories) N/A N/A N/A		Cultural Diversity Course: (Please check one.) <input type="checkbox"/> Core (At least 75% devoted to topics of race, gender, sexual orientation, age, class, and disabilities as they occur in United States Society.) <input type="checkbox"/> Related (At least 25% devoted to the above topics or to a global perspective on topics related to African American, Asian, Hispanic, and Native American inhabitants of the United States.)
? For Writing Intensive Courses, attach a description of the kind and quantity of writing. ? For Upper Division Courses, include a description of the respects in which it is broad and general rather than narrow and specific, and so suitable as GE.		
Attach paper copies of the following: a. Syllabus or course outline. b. Course's student learning outcomes associated with each GE competency or CD designation. c. List of strategies to be used to assess students' achievement of each GE competency or CD designation.		

For New Courses

(Check all that apply):	Instructional Type: Lab	Course will be offered:
<input type="checkbox"/> Course is an elective.	Grading Format: <input checked="" type="checkbox"/> Grade <input type="checkbox"/> P/N	<input checked="" type="checkbox"/> Fall Semester
<input checked="" type="checkbox"/> Course is required for program	Computer Engineering and Electrical Engineering	<input checked="" type="checkbox"/> Spring Semester
<input checked="" type="checkbox"/> Pre- or Co-requisites:	EE 106, EE 107 Concurrently with EE 234	<input type="checkbox"/> Summer Session
<input checked="" type="checkbox"/> Other courses are being changed or eliminated. (Explain.)	EE 334 and EE 344 will be modified to support the C language and other advanced microprocessor concepts	
<input type="checkbox"/> Course content or title is similar to courses in other departments. (Attach copy of letter of agreement with other program(s) contacted. Indicate the nature of the discussions and/or resolution of differences or potential conflicts.)		
Attach paper copies of the following: a. Syllabus or course outline. b. Course's student learning outcomes. c. A list of resources required to offer and support this course. d. A description of how teaching this course will affect department staffing. e. If 400/500 level course, an explanation of added expectations of graduate students.		





Minnesota State University, Mankato
Curriculum Proposal

Signature Page

Department

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

Will B. Hudson
 Department Chair

10-27-06
 Date

Comments:

College Curriculum Committee

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

Kam C. Chow
 Committee Chair

11/3/06
 Date

Comments:

College Dean

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

[Signature]
 Dean

11/6/06
 Date

Comments:

General Education Subcommittee

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

 General Education Subcommittee Chair

 Date

Comments:

Undergraduate Curriculum and Academic Policy Committee

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

AC-A
 UCAP Faculty Chair

4/18/07
 Date

Comments:

Faculty Association Graduate Committee

Recommended
 Not Recommended

 Faculty Association Graduate Chair

 Date

Comments:

Graduate Dean

Recommended
 Not Recommended

 Graduate Dean

 Date

Comments:

Academic Affairs Council

Recommended (Category/ies _____)
 Not Recommended (Category/ies _____)

David Hammer
 Assistant Vice President

4/20/07
 Date

Comments:

Senior Vice President and Vice President for Academic Affairs

Approved (Category/ies _____)
 Not Approved (Category/ies _____)

[Signature]
 Sr. Vice President / Vice Pres. Academic Affairs

4/20/07
 Date

Comments:

EE235 Microprocessor Engineering I Laboratory (1) –Outcomes

Upon completion of this course, students will have the ability to:

1. Use software development tools to enter and assemble programs written in assembly language, and download the output onto demo board for execution.
2. Perform assembly program debugging using software and hardware tools.
3. Write interrupt-driven programs in assembly language.
4. Write assembly programs that utilize parallel ports to drive input and output devices such as LEDs, switches, keypads, seven-segment displays, and LCD.
5. Design and implement assembly programs that use the microprocessor's timer functions to measure waveform characteristics such as pulse width, period, frequency, and duty cycle.
6. Write assembly programs that use timer functions or PWM to control frequency-dependent servos and DC motor.
7. Develop assembly programs that use A/D converter to measure voltage, temperature, and other physical quantities such as humidity, pressure, and light intensity.
8. Write assembly routines that use a D/A converter to generate waveforms (or generate sirens using a speaker).
9. Develop assembly programs that use serial interface such as UART or SPI to interface with I/O devices such as seven-segment display driver.

EE235 Microprocessor Engineering Laboratory I Syllabus

Instructor: Dr. Han-Way Huang (email: hanwayh@yahoo.com)
Office: Trafton E324
Phone: 389-1121
Textbook: "PIC Microcontroller -- An Introduction" by Hanway Huang, Delmar Thompson.

Contents:

- SSE8680 demo board functions.
- Mplab assembler and development environment MPLAB IDE
- Communication with the SSE8680 using a PC.
- Assembly language programming on the SSE8680 demo board.
- Interrupt driven input
- Using program loop to create time delay and make songs.
- Using timer function to measure frequency and generate digital waveform
- USART I/O
- SPI experiments

Objectives

After taking this course, you will learn

- Downloading programs into the SSE8680 demo board for execution.
- Designing assembly language programs for the Microchip PIC18 microcontroller.
- Designing structural programs for the PIC18 microcontroller.
- Performing parallel I/O using the SSE8680 evaluation board.
- Performing interrupt-driven input and output.
- Designing program loops to create time delays.
- Using PIC18 timer functions to measure signal frequency, period, pulse width, etc.
- Using the PIC18 timer function to generate digital waveforms.
- Using USART function to perform string I/O.
- Using SPI function to interface with peripheral chips with serial interface

Lab Requirements

- Each lab assignment must be demonstrated to be working. A lab is considered working if and only if it works according to the specification.
- A lab report must be handed in within one week after the lab demo is due.
- Program must be your own work and cannot be copied.
- The lab report should include:
 - (1) Problem description
 - (2) Algorithm procedure
 - (3) Flowchart
 - (4) Program source code with adequate comments
 - (5) TA (or instructor) signature on the program source code (very important)
 - (6) Conclusion
- (7) Report must be typed

Grading methods:

- A: 90% - 100%.
- B: 80% - 89%
- C: 70% - 79%
- D: 60% - 69%
- F: 0% - 59%

Resources Needed to Teach EE235

No new resource is needed to teach this course.

Impact to the Department Staffing

This course will be offered as part of the load in the ECET department. Staffing will be resolved within the resources available in the ECET department.

Attachment added October 27, 2006

Laboratory schedule (Lab periods are 110 minutes long)

EE235 Microprocessor Engineering I Laboratory (credit 1)

Laboratory schedule:

Week 1 Course introduction, report guidelines, correct use of equipment

Week 2 Use software development tools to enter and assemble programs written in assembly language, and download the output onto demo board for execution.

Week 3 Perform assembly program debugging using software and hardware tools.

Week 4 Write interrupt-driven programs in assembly language.

Week 5 Write assembly programs that utilize parallel ports to drive input and output devices (LEDs, switches, keypads, seven-segment displays, and LCD will be used).

Week 6 Design and implement assembly programs that use the microprocessor's timer functions to measure waveform characteristics.

Week 7 Write assembly programs that use PWM to control frequency-dependent servos and DC motors.

Week 8 Develop assembly programs that use A/D converter to measure voltage

Week 9 Write assembly routines that use a D/A converter to generate waveforms (showing concepts of program timing)

Week 10 Develop assembly programs that use serial interface to UART

Week 11 Develop assembly programs that use serial interface to SPI devices

Week 12 Develop assembly programs that use serial interface to a seven-segment display driver.

Week 13 Student project

Week 14 Student project

Week 15 Project presentations