PELLEISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

ADVANCED MICROPROCESSORS II
EET 2340

Class Hours: 1.0
Laboratory Hours: 3.0
Credit Hours: 2.0
Date Revised: Spring 02

NOTE: This course is not intended for transfer credit.

Catalog Course Description:

This course is an extended course in microprocessor technology using modern 16/32 bit microprocessors based primarily on the Motorola 68000 and 68020. Topics include capabilities, exception processing, programming the 68000, IEEE 488 basics, and the use of logic analyzers for troubleshooting.

Entry Level Standards:

The student must have an understanding of 8 bit microprocessor basics. This includes full instruction set understanding as well as comprehension of interrupts and interfacing of several devices to the CPU. In addition, the student must have an understanding of 16/32 bit microprocessor basics such as architecture and instruction set.

Prerequisite:

EET 2330

Textbook(s) and Other Reference Materials Basic to the Course:

Textbook:
Microprocessor Interfacing, Heathkit, Heath Company
M 68000 Programmer's Reference Manual, Motorola

References:
16 Bit Microprocessors, Triebel, Prentice-Hall
The Motorola MC 68000, Harmon, Lawson, Prentice-Hall
16 Bit Microprocessor Architecture, Dollhoff, Reston

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1-2</td>
<td>Exception Processing</td>
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<tr>
<td>3-4</td>
<td>Interrupt Vectors</td>
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<tr>
<td>5-7</td>
<td>Program Examples</td>
</tr>
<tr>
<td>8-9</td>
<td>Intro to ATE</td>
</tr>
</tbody>
</table>
II. Course Objectives*:

A. Understand exception processing.
B. Write and assemble 68000 assembly language programs. VI, VII
C. Analyze 68000 programs as they are executed using a logic analyzer. IV, V, VI, VII
D. Understand how personal computers may be used for automated testing. II, VI, VII
E. Understand Tektronix VXI Software. II, VI, VII

*Roman numerals after course objectives reference goals of the EET program.

III. Instructional Processes*:

Students will:

1. Participate in classroom discussions which challenge their abilities to think creatively and visualize complex spatial and mathematical relationships to solve problems. Problem Solving and Decision Making Outcome

2. Work in teams to conduct laboratory experiments and also to solve special problem assignments. These activities are designed to foster interpersonal skills in teamwork and develop and enhance leadership skills, students' abilities to express ideas, and students' abilities to reach consensus solutions for the team through negotiation. Active Learning Strategy, Problem Solving and Decision Making Outcome, Personal Development Outcome

3. Use electronic test equipment to test electrical circuits constructed from schematics in the laboratory and acquire data. Use computers with applications software to simulate, analyze, and predict the behavior of electrical circuits. Compare expected responses to experimental responses of electrical circuits. Use the internet for special assignments such as locating data sheets on electronic components. Use computers with word processing software to prepare reports. Technological Literacy Outcome, Information Literacy Outcome, Numerical Literacy Outcome

4. Prepare reports on laboratory experiments which include methodology, mathematical analyses of electrical circuit models, a comprehensive comparison of calculated results with experimental results, and conclusions. Communication Outcome, Numerical Literacy Outcome

5. Discuss the importance of personal qualities such as personal responsibility, time management principles, self-esteem, sociability, self-management, integrity and honesty in school and in the workplace, and dynamics of change in the workplace. Personal Development Outcome, Cultural Diversity and Social Adaptation Outcome, Transitional Strategy

*Strategies and outcomes listed after instructional processes reference Pellissippi State’s goals for strengthening general education knowledge and skills, connecting coursework to experiences beyond the
classroom, and encouraging students to take active and responsible roles in the educational process.

**IV. Expectations for Student Performance***:

Upon successful completion of this course, the student should be able to:

1. Define exception processing.  A
2. Describe how exceptions can be generated internally and externally.  A
3. List the five 68000 instructions that can be used to generate an exception.  A
4. Calculate a user interrupt vector address, given a user interrupt vector number.  A
5. Write 68000 programs on a VAX Cross-Assembler.  B
6. Assemble, Link, and Download these programs to a 68000-based system.  B
7. Run program that have loaded to a 68000-based system and analyze these with the HP Logic Analyzer.  C
8. State the operating principles of ATE.  D
9. Use a PC to output data to a test circuit.  D
10. Use a PC to make measurements of a circuit under test.  E
11. Write procedures using available software to test a given IC.  E

*Letters after performance expectations reference the course objectives listed above.

**V. Evaluation**:

**A. Testing Procedures: 75% of grade**

The evaluation in the classroom will be determined by a combination of chapter tests, homework, and a final exam. The laboratory portion of the grade will be determined by a combination of performance within the lab and the quality of demonstrated comprehension of the lab report. A lab test and lab project may also be included. There will be at least twelve labs during the semester to go along with the classroom material. The percentage that each of these factors count and the frequency of tests and homework is left to the discretion of the instructor, but the following if offered as a guide:

- Chapter Tests: 55%
- Final Exam: 20%

**B. Laboratory Expectations: 20% of grade**

Laboratory topics may vary at the discretion of the instructor, but will be related in a timely manner to the course work. The laboratory serves as a medium for verifying classroom theory. The laboratory report serves as a means to practice both organizing a laboratory notebook and presenting technical observations in written form. Clean, concise, well-organized report writing in an engineering environment is of paramount importance to the EET student. Correct usage of English in the report is necessary and will be evaluated.

**A. Assembly language programs**
B. Down loading a program to the 68000 system and connecting the logic analyzer to verify operation
C. Further practice with the logic analyzer and down loading from the VAX to the 68000 system
D. More 68000 programming practice and logic analyzer usage
E. Lab Test
F. Intro to VXI
G. Intro to VXI software
H. Testing on IC

C. Field Work: 5% of grade

Homework

D. Other Evaluation Methods:

N/A

E. Grading Scale:

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>93 - 100</td>
<td>A</td>
</tr>
<tr>
<td>88 - 92</td>
<td>B+</td>
</tr>
<tr>
<td>83 - 87</td>
<td>B</td>
</tr>
<tr>
<td>78 – 82</td>
<td>C+</td>
</tr>
<tr>
<td>70 – 77</td>
<td>C</td>
</tr>
<tr>
<td>60 - 69</td>
<td>D</td>
</tr>
<tr>
<td>Below 60</td>
<td>F</td>
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VI. Policies:

A. Attendance Policy:

Pellissippi State Technical Community College expects students to attend all scheduled instructional activities. As a minimum, students in all courses must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course (PSTCC Catalog). Individual departments/programs/disciplines, with the approval of the vice president of Academic and Student Affairs, may have requirements that are more stringent.

Class Attendance for Lab
Attendance is required to all lab sessions unless excused by the instructor. Students missing more than four unexcused sessions will receive an "F" and no credit will be received. Students tardy past half an hour will be considered absent.

B. Student Conduct:

The student is encouraged to read the regulations for student conduct in the PSTCC Catalog and Handbook.