PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

MACHINE ORGANIZATION
CST 1410

Class Hours: 3.0  Credit Hours: 4.0
Laboratory Hours: 3.0  Date Revised: Spring 01

Catalog Course Description:
A study of assembly language and computer organization. Topics include organization, architecture, number systems, storage concepts, I/O, memory management and process management.

Entry Level Standards:
None

Prerequisite:
CST 1540

Textbook(s) and Other Reference Materials Basic to the Course:
Irvine, Kip R., Assembly Language for Intel-Based Computers; Prentice hall, 1999.

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Computer Fundamentals, Hexadecimal and Binary Data Codes, Using DEBUG.COM</td>
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<tr>
<td>2</td>
<td>Assembly Process, Using QuickAssembler, Segments, Simple Directives and Assembler Instructons</td>
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<td>3</td>
<td>BIOS and DOS Interrupts</td>
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<td>4</td>
<td>Program Logic and Control Structures</td>
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<td>5</td>
<td>Arithmetic and Logical Operations and Instructions</td>
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<td>6</td>
<td>Simple Combinational Digital Logic Devices</td>
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<td>7</td>
<td>Subroutines and the Stack, Recursion</td>
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<tr>
<td>8</td>
<td>Separately Assembled Modules, Parameter Passing, Libraries</td>
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<tr>
<td>9</td>
<td>Addressing Modes, Single-dimension Arrays, Strings</td>
</tr>
<tr>
<td>10</td>
<td>Floating Point (IEEE) Format, BCD</td>
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<tr>
<td>11</td>
<td>Advanced Arithmetic</td>
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</tbody>
</table>
II. Course Objectives*:

A. Demonstrate familiarity with the architecture and operation of the IBM PC family of computers. I, II, III, IV, V, VI

B. Demonstrate an understanding of basic assembly language techniques by writing short, modular programs in IBM assembler and using these modular programs to enhance understanding of high-level languages. IV, V, VI, VIII, IX

C. Use binary, decimal, and hexadecimal codes to demonstrate an understanding of how programs and data are stored. III, IV

D. Apply Boolean algebra to design and implement algorithms and digital logic to design and implement simple hardware components of a computer. III, V, VI

E. Use program development facilities and utilities to create executable programs. IV

F. Demonstrate an understanding of a hierarchial directory structure and manipulate files within this structure. IV

*Roman numerals after course objectives reference goals of the Computer Science Technology program.

III. Instructional Processes*:

Students will:

1. Create several short modular programs using 8086/8088 assembler which implement several common algorithms and data structures. Communication Outcome, Problem Solving and Decision Making Outcome, Technological Literacy Outcome, Information Literacy Outcome, Active Learning Strategy

2. Examine and implement algorithms that are efficient and reliable. Problem Solving and Decision Making Outcome, Technological Literacy Outcome, Active Learning Strategy

3. Use professional tools to produce software components and documentation. Technological Literacy Outcome, Transitional Strategy

4. Use professionally accepted methods and materials in the approach to completion of applications. Technological Literacy Outcome, Personal Development Outcome, Transitional Strategy

5. Practice elements of the work ethic such as punctuality, professionalism, dependability, cooperation, and contribution. Personal Development Outcome

*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. Identify and use the major addressing modes of PC assembler. A, B
2. Write programs in PC assembler making use of the processor status word for conditional branching. A, B, D
3. Implement a stack using PC assembler and make use of the user stack. A, B
4. Write functions and procedures in PC assembler. A, B
5. Write programs in PC assembler which call functions and procedures and pass arguments. A, B
6. Define, invoke and expand macros in PC assembler programs. A, B, D
7. Use the PC bitwise instructions to implement the laws of logic and Boolean algebra. A, B, D
8. Write PC assembler programs which call system macros and procedures. A, B
9. Create modular programs using PC assembler. B
10. Produce list files produced from PC assembler source files, relating the machine code produced to the PC assembler statements which produced it. B, C
11. Know the different internal formats of integers, real numbers and character data and be able to convert between the forms whenever possible. C, D
12. Use Debug in debugging programs. A, B, C, D
13. Write high-level language modules which call PC assembler assembler modules or vice-versa.
15. Use the major assembler directives for memory reservation and initialization. A, B, C
16. Explain the operation of 2-pass assembler, such as the PC assembler. B, C
17. Use the linker and answer questions concerning the linking process. B
18. Create and use a macro library using PC assembly language. B
19. Create, edit, delete, rename, copy and display the contents of files. A, E, F
20. Use PC compilers, assembler, linker and symbolic debuggers to develop programs. A

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

V. Evaluation:

A. Testing Procedures: 60% of grade
There will be three 50-minute tests. Dates will be announced in class and each test will count as a percent of the final grade as follows:

- Test 1 10%
- Test 2 20%
- Test 3 30%

An optional comprehensive final will also be offered with the grade being averaged with the 3 required tests.

B. Laboratory Expectations: 20% of grade

Several laboratory assignments will be given for the term. Assignments will be selected from topics covered in class. If all laboratory assignments are completed, they will count for 20% of the final grade. Failure to complete all laboratory assignments will result in a grade of F in the course. Late assignments will be assessed a penalty of 10% the first day, 30% the second day, and 100% the third day.

C. Field Work:

N/A

D. Other Evaluation Methods: 20% of grade

A quiz over the current or any previous class or laboratory topic may be given at any time, with or without notice, in class or in lab. These quizzes will account for 20% of your final grade. There will be no makeup quizzes for any reason. If all quizzes are taken, approximately 25% of them will be dropped to determine the student's quiz "average".

E. Grading Scale:

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>90 - 100</td>
<td>A</td>
</tr>
<tr>
<td>80 - 89</td>
<td>B</td>
</tr>
<tr>
<td>70 - 79</td>
<td>C</td>
</tr>
<tr>
<td>65 - 69</td>
<td>D</td>
</tr>
<tr>
<td>0 - 64</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.

B. Academic Dishonesty:

You are expected to do your own work in this class. If you are unable to complete an assignment on your own, it is your responsibility to get help from the professor (before the assignment is due).

C. Other Policies:

All exams are required, and make-ups will be allowed only in the rarest of cases. In the event that you have an emergency, you must notify the instructor in advance if at all possible.