Pellissippi State Community College
Master Syllabus

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**COMPUTER ORGANIZATION**
**CSIT 1600**

Class Hours: 3.0
Laboratory Hours: 3.0
Credit Hours: 4.0
Revised: November 2009

Instructor:
Office:
Phone:
Email:

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**Catalog Course Description:**
Number systems, Boolean algebra, combinational and sequential circuits, processor functional units and control, pipelining, memory and caching, stored program computing, memory management, computer system organization, assembly language programming.

**Entry-Level Standards:**
The student must have math, writing, verbal, and English language skills at the college level.

**Pre-requisites:** CSIT 1020 or department approval.

**Textbooks and Other Supplies:**
The Essentials of Computer Organization and Architecture , Linda Null and Julia Lobur, Jones and Bartlett, second edition.

## I. WEEK/TOPIC:

| Week | Topic |
|---|---|
| 1 | Chapter 1 - Introduction |
| 2 | Chapter 2 - Data Representation |
| 3 | Chapter 3 - Boolean Algebra and Digital Logic |
| 4 | Chapter 3 |
| 5 | **Test 1: Chapters 1, 2 and 3,** Chapter 4 - A Simple Computer |
| 6 | Chapter 4, Chapter 5 - Instruction Set Architecture |
| 7 | Chapter 5, 80x86 Assembly |
| 8 | 80x86 Assembly |
| 9 | **Test 2 - chapters 4, 5 and 80x86 assembly**, Chapter 6 - Memory |
| 10 | Chapter 6 |
| 11 | Chapter 7 - I/O (up to Floppy Disks, 7.6.2) |
| 12 | Chapter 8 - System Software (up to 8.6, Database Software) |
| 13 | Chapter 9 (up to 9.5) - Alternative Architectures |
| 14 | **Test 3 - chapters 6, 7, 8, 9** |
| 15 | **Optional, Comprehensive Final Exam** |
| | **Chapters 1, 2, 3, 4, 5, 6, 7, 8 , 9** |

## II. COURSE OBJECTIVES:

A. Demonstrate knowledge of principles and underlying concepts of Boolean algebra and logic gates. I,II,III,IV,VI,IX,XI
B. Demonstrate the ability to logically manipulate binary data and the computer's hardware through assembly language programming. I,II,III,IV,V,VI,XI
C. Demonstrate familiarity with the hardware components of a digital computer such as registers, CPU, ALU, memory and I/O devices. I,II, III,IV,VI,IX,XI

## III. INSTRUCTIONAL PROCESSES: Student will:

1. Calculate unsigned, signed and floating-point binary number values. *Mathematics Outcome, Technological Literacy Outcome*
2. Design, implement, and test the hardware for a system using a digital circuit simulator. *Communication Outcome, Technological Literacy Outcome, Mathematics Outcome, Transitional Strategy, Active Learning Strategy*
3. Design, implement, and test assembly language programs. *Communication Outcome, Technological Literacy Outcome, Transitional Strategy, Active Learning Strategy*
4. Describe and use basic ISA-level concepts such as registers and stacks, memory addressing modes and ISA-level instruction types and formats. *Communication Outcome, Technological Literacy Outcome, Transitional Strategy, Active Learning Strategy*
5. Detect/correct errors using error detection/correction codes. *Mathematics Outcome, Technological Literacy Outcome, Transitional Strategy, Active Learning Strategy*
6. Explain the fetch-decode-execute cycle. *Communication Outcome, Technological Literacy Outcome*
7. Describe pipelining, parallel processing and calculate speedup. *Communication Outcome*, *Mathematics Outcome, Technological Literacy Outcome*
8. Calculate cache miss and hit rates, map main memory addresses to cache blocks. *Mathematics Outcome, Technological Literacy Outcome*
9. Describe the difference between physical and virtual memory addresses and calculate physical addresses. *Communication Outcome, Mathematics Outcome, Technological Literacy Outcome*
10. Describe direct memory access, the difference between polling and the difference between character and block I/O. *Communication Outcome, Technological Literacy Outcome*
11. Describe disk sectors, error correction codes and calculate disk latency. *Communication Outcome, Mathematics Outcome, Technological Literacy Outcome*
12. Explain cache replacement and write policies. *Communication Outcome, Technological Literacy Outcome*
13. Describe basic issues of process management. *Communication Outcome, Technological Literacy Outcome*
14. Describe the compilation, assembly and linking processes. *Communication Outcome, Technological Literacy Outcome*
15. Explain the difference between RISC and CISC and calculate execution time. *Communication Outcome, Mathematics Outcome, Technological Literacy Outcome*

16. Describe different parallel processing techniques. *Communication Outcome, Technological Literacy Outcome*
17. Use professionally accepted methods and materials in their approach to completion of applications. *Technological Literacy Outcome, Transitional Strategy, Active Learning Strategy*
18. Practice elements of the work ethic such as punctuality, professionalism dependability, cooperation, and contribution. *Communication Outcome, Transitional Strategy, Active Learning Strategy*

## IV. EXPECTATIONS FOR STUDENT PERFORMANCE:

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

1. Convert numerical data between internal (binary) and external forms. A, B
2. Design, implement and test simple to moderately complex digital systems. A, C
3. Design, implement and test simple to moderately complex assembler programs. B, C
4. Describe and use basic ISA-level concepts such as registers and stacks, memory addressing modes and ISA-level instruction types and formats. C
5. Detect/correct errors using error detection/correction codes. C
6. Explain the fetch-decode-execute cycle. C
7. Describe pipelining, parallel processing and calculate speedup. C
8. Calculate cache miss and hit rates, map main memory addresses to cache blocks. C
9. Describe the difference between physical and virtual memory addresses and calculate physical addresses. C
10. Describe direct memory access, the difference between polling and the difference between character and block I/O. C
11. Describe disk sectors, error correction codes and calculate disk latency. C
12. Explain cache replacement and write policies. C
13. Describe basic issues of process management. C
14. Describe the compilation, assembly and linking processes. C
15. Explain the difference between RISC and CISC and calculate execution time. C
16. Describe different parallel processing techniques. C

## V. EVALUATION:

A. Testing Procedures:
Three exams will be given and one optional, final comprehensive exam. Failure to make a passing test average will result in a grade of F for the course.

B. Laboratory Expectations:
At least 4 digital and 4 assembly language labs will be given. Failure to make a passing lab average will result in a grade of F for the course.

C. Field Work: N/A

D. Other Evaluation Methods: Quizzes and homework as indicated by the instructor in a supplement to the syllabus.

E. Final Grade:

| | |
|---|---|
| 93 – 100 | A |
| 88 – 92 | B+ |
| 83 – 87 | B |
| 78 – 82 | C+ |
| 73 – 77 | C |
| 65 – 72 | D |
| Below 65 | F |

## VI. POLICIES:

A. Attendance Policy:
Pellissippi State Community College expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of Academic and Student Affairs, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy can be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal can be addressed to the vice president of Academic and Student Affairs *(Pellissippi State Catalog)*

B. Academic Dishonesty:
Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to):

- Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments
- Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services, without proper documentation of the original source
- Providing others with information and/or answers regarding exams, quizzes, homework or other classroom assignments unless explicitly authorized by the instructor
- Taking an exam for another student

C. Accommodations for Disabilities:
Students who need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Services for Students with Disabilities (SSWD) in order to receive accommodations in this course. Services for Students with Disabilities may be contacted by going to Goins 134 or 126 or by phone: 694-6751(Voice/TTY) or 539-7153. More information is available at www.pstcc.edu/departments/swd/.

D. Computer Usage Guidelines:
College-owned or –operated computing resources are provided for use by students of Pellissippi State. All students are responsible for the usage of Pellissippi State's computing resources in an effective, efficient, ethical and lawful manner. *(Pellissippi State Catalog)*

E. Other:
In the event that you have an emergency beyond your control, you must notify the instructor as soon as possible.