Michigan Technological University
SAT 1610 - Spring 2008
Computer and Operating System Architecture

webpage: ***http://www.ece.mtu.edu/faculty/btdavis/courses/mtu_eet1610_s08***

Course Description:

Fundamentals of computer organization, operating system architecture, Personal Computer (PC) and Workstation (WS) major subassemblies, PC and server configuration planning, power interfaces, system assembly/set-up, connection of peripherals, installing fundamental operating system software, system testing/debugging and planning and installation of application software portfolio.

This course follows on the Introduction to Programming course. Introduction to Programming presents a top-down examination of using computers as a tool. This course (SAT1610) presents a bottom-up examination of the mechanisms of operation of the computer system. Introductory level understanding will be expected of range of areas, including basic processor/controller design concepts, assembly language characteristics, assembly language programming, programming abstractions, low-level operating system requirements, and personal computer construction concepts.

Instructor: Brian T. Davis
Email: btdavis@mtu.edu
Office: 415 EERC
Phone # : 487-2256

Lectures :

Tuesday, & Thursday: 10-11 am; 229 EERC

Labs :

Section L 01	Tuesday	1pm - 3pm; 328 EERC
Section L 02	Tuesday	3pm - 5pm; 328 EERC
Section L 03	Thursday	1pm - 3pm; 328 EERC

Required Text:

[Patt04] **Introduction to Computing Systems: From Bits & Gates to C & Beyond**, 2nd Edition
Yale N. Patt and Sanjay J. Patel, McGraw Hill
ISBN-13 9780072467505

Resource Text(s):

[Mueller07] **Upgrading and Repairing PCs**, Eighteenth Edition
Scott Mueller, Que, 2008.
Print ISBN-13: 978-0-7897-3697-0.

[Hennessy07] **Computer Architecture: A Quantitative Approach**, Fourth Edition,
John Hennessy and David Patterson, Morgan Kaufmann.
ISBN-13: 978-0123704900; Published September 13, 2006; Copyright 2007.

Other **required** reading material will be provided via the course web pages.

Goals

By the completion of the semester, students should have the relevant knowledge and be capable of demonstrating and understanding of the following:

- History of computers & use of abstractions in the use of computers
- Data representation using binary
- Combinational logic, sequential logic, finite state machines, and how these topics relate to micro-processor/microcontroller design.
- VonNeumann architecture and how this model enables general purpose computing and may not be employed for embedded devices
- Instruction Set design: variable length, fixed length, accumulator, GPR, memory-to-memory
- Basic Assembly language programming using the LC-3
- Understanding of different processor design philosophies, including CISC, RISC, VLIW, Super-scalar, out-of-order, SMT and Multi-core
- Input/Output processing using polling, interrupts and DMA
- Runtime stack operations, use of stacks in compiled programs & operating systems
- How hardware architecture concepts relate to programming

Labs

The lab content will include most of following content items, but because this is the first offering of this course, the complete lab sequence is still under development and may include items not on this list.

- Personal computer components & identification - through software
- Personal computer components & identification - through visual inspection
- Boot process (POST) failures and indications
- Chronology of interfaces (ISA, VESA, AGP, PCI, PCIe) and identification
- Installation of Operating System on a clean PC
- Modification & Customization of the Windows XP operating system
- Introduction to Assembly Language programming (LC-3)
- Assembly language programming - loops
- Assembly language programming - recursion

Attendance

Attendance will not be taken in this course, however it will count toward the class participation portion of the grade. If you feel that you have a legitimate reason for not attending any course session, if you let me know BEFORE the class session, via email, phone, or personal discussion, just about any excuse is likely to be favorably received. If you wait until AFTER the class session to see me about material covered in your absence, or if you fail to see me about a missed class the absence is likely to negatively impact your class participation perception.

Evaluation/Grading

Grading is by definition somewhat subjective due to the nature of the class. Class participation will count for 5% of the final grade, and I expect students to arrive to class having read the assigned material. Failure to come to class prepared will result in a reduction in the class participation, and potentially final grade.

The weighting of class components for final grades are as follows:

Midterm Exams (2)	15% each
Final Exam	20%
Labs (approximately 10)	30%
Quizzes (approximately 7)	15%
Class Participation	5%

Two evening exams will be scheduled, and these will allow for the cancellation of two class lectures.

All exams/quizzes will be comprehensive and closed book/notes, with no calculators of any sort allowed.

Student Expectations

- Students must remain current with class work and homework problems
- Prompt attendance at every class session is expected
- All students are expected to participate in the class session
- Everyone in the classroom will be treated with respect
- If you are sick, or must miss a class for some reason, please contact the instructor PRIOR to being absent. A short email or phone call will suffice, this is professional courtesy.
- Make sure to get the answers to all your questions; asking in class is the best way, but the course listserv or office hours can also be utilized.

Assignment questions & Late assignments

I will answer questions regarding assignments in office, lecture and via electronic forums. I will cease to respond to questions regarding an assignment 24 hours prior to that assignments due date. i.e. if an assignment is due Monday @ 4pm, ask your question PRIOR to Sunday @ 4pm or it will not be answered.

Late assignments - labs, or any other submitted work - will be penalized 20% for each M-F weekday that they are late. Exceptions to this rule will only be made for cases brought to the instructors attention PRIOR to the due date.

Plagiarism and Cheating:

All work will be evaluated within the context of the Michigan Tech Academic Integrity Policy, which can be found at:
http://www.studentaffairs.mtu.edu/dean/judicial/policies/academic_integrity.html
In the context of this class, plagiarism is defined as representing someone else's work as your own. Cheating is defined as violating stated rules for an exam or an assignment. Plagiarized work will receive a grade of F, as will any assignment in which cheating occurred. If any student cooperation is allowed this will be explicitly spelled out in class or the assignments, otherwise no working in groups is allowed. Flagrant or repeated violations of this academic code of conduct will result in a grade of F assigned for the course.