ASSEMBLY LANGUAGE/ COMPUTER ORGANIZATION CSCI 241 FALL 2015

COURSE DESCRIPTION: Concepts of assembly language and the machine representation of instructions and data of a modern digital computer are presented. Many of the fundamental concepts studied in this course are used to build the framework of a computer science education. Students will have the opportunity to study machine instructions, addressing, stack operations, subroutines, and programmed and interrupt driven I/O. Also, basic concepts of machine organization are studied. This will include computer architecture at the register level and the micro-operation components of instructions. Students will utilize the Intel 8086-80586 instruction set and will perform assembly language programming exercises. Prerequisites: CSCI 151

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Office: JOUR 235 Office Hours: M 10:00 AM – 11:00 3:30 PM-6:30 PM
W 10:00 AM – 11:00 3:30 PM-6:30 PM
TR Also available by appointment
Communication by email is welcome at any time, evenings, and weekends.

Textbooks: Materials for the major topics for this course are presented in Class Notes, which will be provided to students free of charge.
Supplemental Textbooks: On reserve in the Library for extra reading:
Assembly Language For Intel-Based Computers. Author: Kip Irvine. Publisher: Prentice Hall. 4th Ed.,
Assembly Language for the IBM PC. Author William Jones. Publisher: Jones. 3rd edition.

Student Learning Outcomes: Students will demonstrate knowledge of the following:
Outcome #1 Binary numbering systems and conversions; floating point representation
Determined from Exam #1
Outcome #2 Concepts of Machine Instructions, Assembly and linking, assembly language programming (Unconditional jumps, flags, subroutines, Stacks)
Determined from Exam #2
Outcome #3 Concepts of Machine Instructions, Assembly and linking, assembly language programming (Subroutines or Procedures, Stacks)
Determined from Exam #3
Outcome #4 Beginning concepts of Computer Organization
Determined from Exam #4
Outcome #5 Basic concepts of I/O devices; memory mapped I/O; Interrupts ; Arrays, addressing modes and Floating Point Instructions
Determined from Exam #5
Outcome #6 Integration of assembly language instructions, machine cycles, and computing organization.
Determined from Final Exam

Weekly Schedule

WEEK 1 August 31 - September 4
Assembly Language Overview
Numbering Systems Topics: Number representation; Conversions to and from BINARY OCTAL HEXADECIMAL DECIMAL 2'S Complement; Logical Operators: AND OR NAND NOR NOT XOR

WEEK 2 September 7 - September 12
Overview of the Assembly & Link Process
Topics: Elementary Instruction Format; Opcodes & Addresses; PROGRAMMING in Assembly Language; Examples of BIOS ROM Int I/O; Basic Assembly Language Instructions MOV, ADD, SUB, INC, DEC, etc.
Topics: Flip Flops and Registers
Topics: Useful functions, using DUMPREGS and DUMPMEM. Writing your first assembly language program;
Assignment #1 Install the MASM assembler and assemble the first program

WEEK 3 September 14 - September 18
Topics: Basic I/O Operations, ReadChar, WriteChar, WriteString - more program examples
Topics: The BIOSROM - History Lesson on 16 bit, 32 bit, 64 bit environments
Assignments: Program 1,2,3

WEEK 4 September 21 - September 25
Test #1 - Numbering systems, 2's complement, Boolean Functions

Topics: Unconditional Jump; Compare (CMP); Conditional Jumps; Sign Flag; Zero Flag
Assignments #1,#2,#3
WEEK 5 September 28 - October 2
Topics: More on Conditional Jumps
Topics: More on compiling complex Conditional Jumps, Carry and Overflow; Double Precision ADD example program.
WEEK 6 October 5 - October 9
TEST #2 - Conditional Jumps and FLAGS
Topics: Procedures and Subroutine; The Stack; The CALL Statement, PUSH, POP
WEEK 7 October 12 - October 16
Topics:; Examples of how stacks are used in Computer Science
Test #3 Procedures and Stacks
WEEK 8 October 19 - October 23
Topics: Introduction to Computer Organization; Flip Flops and Registers revisited
Micro Operations and the Machine Instruction Cycle; Architecture of the 8086 Microprocessor; Hardware Concepts; AND, OR, NOR, NAND Gates; Flip-Flops: RS, JK, Toggle; Register to Register Transfer
WEEK 9 October 26 - October 30
Topics: How the computer really works; MOV, JMP, JNS Instruction implementation

WEEK 10 November 2 - November 6
Topics: CALL RET PUSH and POP defined by Micro Operations
Assignment #5, #6;
WEEK 11 November 9 - November 13
Test #4 Computer Organization
WEEK 12 November 16 - November 20
Memory Arrays; Indirect addressing, arrays; floating point instructions and representation;
WEEK 13 November 23 - November 27 Thanksgiving
Topics: Memory Mapped I/O
WEEK 14 November 30 - December 4
Topics: Interrupts
Topics: Examples of non-memory mapped I/O; Machine I/O
WEEK 15 December 7 - December 11
Comprehensive Final Exam

Grade Calculation: A= 90-100 B= 80-89 C= 70-79 D= 60-69 F=Below 60
(test #1 test #2 test #3 test #4) = 70%
Homework=10%
Final Exam=20%

There will be 6-8 Homework Assignments
HOMEWORK ASSIGNMENTS: Do your OWN work. There are 6-8 homework assignments designed to help students learn how to program in assembly language. Student who do not do the assignments are more likely to fail the exams. It is an absolute requirements that students be able to write, assemble, link, and run Assembly Language programs. If you do not meet this requirement, you WILL NOT PASS this course.

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment." (See Student's Guide Handbook, Policies and Procedures, Conduct).

EARLY INTERVENTION FOR FIRST YEAR STUDENTS:
Early intervention for freshmen is designed to communicate the University's interest in their success and a willingness to participate fully to help students accomplish their academic objectives. The university through faculty advisors and mentors will assist students who may be experiencing difficulty to focus on improvement and course completion. This process will allow students to be knowledgeable about their academic progress early in the semester and will provide faculty and staff with useful data for assisting students and enhancing retention. Grade reports will be mailed by the end of the sixth week of the semester.

Students requesting accommodations for disabilities must go through the Academic Support Committee. For more information, please contact the Director of Disability Resources & Services, Halladay Student Services Bldg., Room 303D, (903) 886-5835.

Students with Disabilities:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services
Texas A&M University-Commerce
Gee Library, Room 132
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
StudentDisabilityServices@tamuc.edu

A&M-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.