ASSEMBLY LANGUAGE/ COMPUTER ORGANIZATION CSCI 241 SPRING 2014

COURSE DESCRIPTION: Concepts of assembly language and the machine representation of instructions and data of a modern digital computer are presented. Students will have the opportunity to study machine 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 micro-operation components of instructions. Students will utilize the Intel 8086-80586 instruction set and will perform programming exercises in MS-DOS mode. Prerequisites: CSCI 151

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Office: JOUR 235 Office Hours: M 9:00 AM – 11:00 3:30 PM-6:30 PM
W 9:00 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: Assembly Language For Intel-Based Computers. Author: Kip Irvine. Publisher: Prentice Hall. Class Notes are **required** and will be provided to the student free of charge (for the first copy).

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 gain knowledge and understandings 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 Understanding concepts of Computer Organization
Determined from Exam #4
Outcome #5 Understanding 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

SYLLABUS for CSCI 241

Week1: Outcomes: To understand the concept of numbering systems; to be able to convert between Octal, Hexadecimal, Decimal, and Binary numbering systems; to understand 2's complement representation of negative binary numbers, to understand the Boolean functions: OR, AND, NOR, NAND,XOR.
Topics: Number representation; Conversions to and from BINARY OCTAL HEXADECIMAL DECIMAL 2'S Complement; Logical Operators: AND OR NAND NOR NOT XOR

Week 2-3: Outcome: To understand the concept of assembly and linking, to be able to assembly and link an assembly language program, to understand the function of the BIOROM and to use the INT instruction to perform basic I/O, to be able to use the MOV, ADD, SUB, INC, DEC, INT instructions, to write and debug simple assembly language programs.

Topics: Overview of the Assembly & Link Process; 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.
Assignment #1 Install the MASM assembler and assemble the firsts program
Test #1 - Over Binary conversions, 2's complement, Boolean functions

Week 4-5-6:
Outcomes: To be able to use the unconditional jump instruction; to understand the concept of the sign flags; to be able to write conditional jumps in assembly language; to understand the concept of subroutines (procedures); to understand the concept of the stack; to understand what a general register and segment registers are.
Topics: Unconditional Jump; Compare; Conditional Jumps;
Assignment #2,#3 Test #2
Topics: Procedures, Stacks, PUSH POP; General Registers, Segment Registers
Assignment #4; Test #3

Week 7-8-9-10:
Outcomes: To understand register to register transfers; to understand what a machine cycle is; to examine the general concepts of how a computer executes an instruction.
Topics: Architecture of the 8086 Microprocessor; Hardware Concepts; AND, OR, NOR, NAND Gates; Flip-Flops: RS, JK, Toggle; Registers repeated; BASIC COMPUTER ORGANIZATION; Micro Operations; Machine cycles and instructions; How the computer really works; MOV, JMP, JNS Instruction implementation
Assignment #5, #6; Test #4

Week 11
Outcomes: To understand the functioning of common I/O devices.
Topics: The Mouse; VGA Graphics

Week 12
Outcome: To understand the use of arrays; to examine other addressing modes; to be able to convert a decimal number into floating point representation.
Topics: Indirect addressing, arrays; floating point instructions;
Assignment #7

Week 13
Outcome: To understand the difference between memory mapped I/O and non-memory mapped I/O; to examine assembly language I/O instructions.
Topics: Example of non-memory mapped I/O; Machine I/O

Week 14
Outcome: To understand the functioning of a hardware interrupt; to examine assembly language code that implements an interrupt.
Topics: Machine INTERRUPTS; Test #5

Week 15
Outcome: To review all material covered in the course.
Topics: Review

Week 16
Comprehensive Final Exam

Grade Calculation: A= 90-100 B= 80-89 C= 70-79 D= 60-69 F=Below 60
test #1_____10%
test #2_____15%
test #3_____15%
test #4_____15%
test #5_____15%
Final Exam_____30%

(6 or more unexcused absences = DF Drop Fail) 6-8 Homework Assignments

1. If you come into class after your name is called, it is considered an absence. If you have a special circumstance, which prevents you from being in class on time, please come see me.

2. 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.

3. Please also be aware that any students who is caught cheating during an exam, as a first offense, will receive the grade of "F" on that exam. Students with a second offense of cheating will receive the grade of "F" in the 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