COCS 2325.02W (CSCI 241)

Machine Language / Computer Organization
SPRING 2020

INSTRUCTOR INFORMATION

Instructor: S. Saffer, Ph.D.
Office Location: JOUR 235
Office Hours: M 11:00 AM – 12:30 PM
                  TR11:00 AM – 12:30 PM 4:45 PM – 6:00 PM
                  Communication by email is welcome at any time, including evenings, and weekends.
Office Phone:
Office Fax:
University Email Address: sam.saffer@tamuc.edu
Preferred Form of Communication: email
Communication Response Time: Response to Emails should be no more and 24 hours.

COURSE INFORMATION

Materials – Textbooks, Readings, Supplementary Readings

Textbook(s) Required: Materials for the major topics for this course are presented in Class Notes, which will be provided to students free of charge.
Software Required: MASM Assembler and Linker – Because of our MSDN University License with Microsoft, we will make this software available to the student free of charge.
Optional Texts and/or Materials: 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.

The syllabus/schedule are subject to change.

Course Description

Machine Language and Computer Organization. Three semester hours. (1, 2, 3) The concepts of assembly language and the machine representation of instructions and data of a modern digital computer are presented. The fundamental concepts studied in this course include machine instructions, addressing, stack operations, subroutines and procedures, computer organization and architecture at the register level, and the micro-operation components of machine instructions. Students will perform assembly language programming exercises. Prerequisite: COSC 1436 or CSCI 151.

Topics include:
Basic computer organization; machine cycle, digital representation of data and instructions; assembly language programming, assembler, loader, macros, subroutines, and program linkages.

Student Learning Outcomes
Student Learning Outcomes: Students will demonstrate knowledge of the following:
Outcome #1 Binary, Octal, Decimal, and Hexadecimal numbering systems and be able to convert a number to any of these numbering systems
Determined from Exam #1
Outcome #2 Concepts of Machine Instructions, Assembly and linking process, the Flag Register, and be able to write assembly language programs using the Unconditional jumps, flags, and conditional jumps
Determined from Exam #2
Outcome #3 Concepts of Machine Instructions, that use the Hardware Stack and be able to write assembly language programs using Subroutines or Procedures, Stacks
Determined from Exam #3
Outcome #4 Beginning concepts of Computer Organization, including the Machine Cycle, Register to Register transfers, associated hardware registers, the Ring Counter Sequencer, and the mapping of hardware functions to software instructions
Determined from Exam #4
Outcome #5 Integration of knowledge acquired from the first five Objectives (assembly language instructions, machine cycles, and computing organization) into a basic understanding of how a computer functions.
Determined from Final Exam

COURSE REQUIREMENTS

Minimal Technical Skills Needed
Students will use Microsoft Windows 10 Operating System when performing assembly language programming exercises. Students are expected to be familiar with MyLeo Online (D2L Brightspace).

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Instructional Methods

Instructional methods include lectures and exercises, and programming assignments, which are documented in the class notes. Class notes and video lectures are included in MyLeo Online (D2L Brightspace). Students are expected to complete exercises and take practice exams, which are designed to help students determine which materials need further review. The educational process is further enhanced by the assembly language programming assignments.

Student Responsibilities or Tips for Success in the Course

Student should attend lectures and review lectures which are included in myLeo Online (D2L Brightspace). Students should also work all assigned exercises and complete all programming assignments.

GRADING

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 (Programming assignments) =10% Final Exam=20%

Assessments

Student Learning Outcome #1 – assessed by Test#1
Student Learning Outcome #2 – assessed by Test#2
Student Learning Outcome #3 – assessed by Test#3
Student Learning Outcome #4 – assessed by Test#4
Student Learning Outcome #5 – assessed by the Final Exam
An Average of Test#1, Test#2, Test#3, Test#4 make up 70% of the final grade.
The Final Exam makes up 20% of the final grade.
Programming assignments make up 10% of the final grade.

TECHNOLOGY REQUIREMENTS

Browser support

D2L is committed to performing key application testing when new browser versions are released. New and updated functionality is also tested against the latest version of supported browsers. However, due to the frequency of some browser releases, D2L cannot guarantee that each browser version will perform as expected. If you encounter any issues with any of the browser versions listed in the tables below, contact D2L Support, who will determine the best course of action for resolution. Reported issues are prioritized by supported browsers and then maintenance browsers.

Supported browsers are the latest or most recent browser versions that are tested against new versions of D2L products. Customers can report problems and receive

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support for issues. For an optimal experience, D2L recommends using supported browsers with D2L products.

Maintenance browsers are older browser versions that are not tested extensively against new versions of D2L products. Customers can still report problems and receive support for critical issues; however, D2L does not guarantee all issues will be addressed. A maintenance browser becomes officially unsupported after one year.

Note the following:

- Ensure that your browser has JavaScript and Cookies enabled.
- For desktop systems, you must have Adobe Flash Player 10.1 or greater.
- The Brightspace Support features are now optimized for production environments when using the Google Chrome browser, Apple Safari browser, Microsoft Edge browser, Microsoft Internet Explorer browser, and Mozilla Firefox browsers.

Desktop Support

Browser	Supported Browser Version(s)	Maintenance Browser Version(s)
Microsoft® Edge	Latest	N/A
Microsoft® Internet Explorer®	N/A	11
Mozilla® Firefox®	Latest, ESR	N/A
Google® Chrome™	Latest	N/A
Apple® Safari®	Latest	N/A

Tablet and Mobile Support

Device	Operating System	Browser	Supported Browser Version(s)
Android™	Android 4.4+	Chrome	Latest
Apple	iOS®	Safari, Chrome	The current major version of iOS (the latest minor or **point** release of that major version) and the previous major version of iOS (the latest minor or **point** release of that major

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Device	Operating System	Browser	Supported Browser Version(s)
			version). For example, as of June 7, 2017, D2Lsupports iOS 10.3.2 and iOS 9.3.5, but not iOS 10.2.1, 9.0.2, or any other version. Chrome: Latest version for the iOS browser.
Windows	Windows 10	Edge, Chrome, Firefox	Latest of all browsers, and Firefox ESR.

- You will need regular access to a computer with a broadband Internet connection. The minimum computer requirements are:
  - 512 MB of RAM, 1 GB or more preferred
  - Broadband connection required courses are heavily video intensive
  - Video display capable of high-color 16-bit display 1024 x 768 or higher resolution

- You must have a:
  - Sound card, which is usually integrated into your desktop or laptop computer
  - Speakers or headphones.
  - *For courses utilizing video-conferencing tools and/or an online proctoring solution, a webcam and microphone are required.

- Both versions of Java (32 bit and 64 bit) must be installed and up to date on your machine. At a minimum Java 7, update 51, is required to support the learning management system. The most current version of Java can be downloaded at: JAVA web site http://www.java.com/en/download/manual.jsp

- Current anti-virus software must be installed and kept up to date.

Running the browser check will ensure your internet browser is supported.
Pop-ups are allowed.
JavaScript is enabled.
Cookies are enabled.

- You will need some additional free software (plug-ins) for enhanced web browsing. Ensure that you download the free versions of the following software:
  - Adobe Reader https://get.adobe.com/reader/
  - Adobe Flash Player *(version 17 or later)* https://get.adobe.com/flashplayer/
  - Adobe Shockwave Player https://get.adobe.com/shockwave/

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- o [Apple Quick Time](http://www.apple.com/quicktime/download/)   http://www.apple.com/quicktime/download/

- At a minimum, you must have Microsoft Office 2013, 2010, 2007 or Open Office. Microsoft Office is the standard office productivity software utilized by faculty, students, and staff. Microsoft Word is the standard word processing software, Microsoft Excel is the standard spreadsheet software, and Microsoft PowerPoint is the standard presentation software. Copying and pasting, along with attaching/uploading documents for assignment submission, will also be required. If you do not have Microsoft Office, you can check with the bookstore to see if they have any student copies.

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu.

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT
Brightspace Support
Need Help?
Student Support

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778 or click on the **Live Chat** or click on the words "click here**"** to submit an issue via email.

System Maintenance

D2L runs monthly updates during the last week of the month, usually on Wednesday. The system should remain up during this time unless otherwise specified in an

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announcement. You may experience minimal impacts to performance and/or look and feel of the environment.

Interaction with Instructor Statement

The instructor is available before and after class and during office hours. Email communication is recommended and encouraged for all other times (including evenings and weekends).

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures/Policies

Attendance/Lateness: Attendance Role is taken at the beginning of class. After a reasonable period of time, students coming in to class late will be counted absent unless the student has a reasonable excuse. Occasional tardiness will be allowed. However, if a student is chronically late to class, an explanation will be required. Missed exams: Students must have a reasonable excuse for missing an exam. Missed exams are usually taken at the end of the semester.

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

University Specific Procedures

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the Student Guidebook.
http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: Netiquette
http://www.albion.com/netiquette/corerules.html

TAMUC Attendance

For more information about the attendance policy please visit the Attendance webpage and Procedure 13.99.99.R0.01.
http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx

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http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf

Academic Integrity

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

Undergraduate Academic Dishonesty 13.99.99.R0.03

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf

Graduate Student Academic Dishonesty 13.99.99.R0.10

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf

ADA Statement

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 162
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
Email: studentdisabilityservices@tamuc.edu

Website: Office of Student Disability Resources and Services

http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/

Nondiscrimination Notice

Texas A&M University-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.

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Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the Carrying Concealed Handguns On Campus document and/or consult your event organizer.

Web url:
http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

COURSE OUTLINE / CALENDAR
COSC 2325 FALL 2019

WEEK 1 Starting 313 – January 17
Assembly Language Overview; Numbering Systems Topics: Course overview; Numbering Systems and Number representation;

WEEK 2 Starting January 20 - January 24
January 2 - Labor Day (University is closed)
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 3 Starting January 27 - January 31
Numbering Systems Continued, Floating Point representaton
Test #1 - Numbering systems, 2's complement, Boolean Functions

WEEK 4 Starting February 13 – February 7
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 5 Starting February 10 - February 14

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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 6 Starting February 17 - February 21
Conditional Jumps; Sign Flag; Zero Flag;   Assignments #4
Topics: More on Conditional Jumps and Flags
Conditional Jumps and Flags reviewed
TEST #2 - Conditional Jumps and FLAGS

WEEK 7 Starting February 24 - February 28
Topics: More on compiling complex Conditional Jumps, Carry and Overflow; Double Precision ADD
example program.

WEEK 8 Starting March 2 - March 6
Topics: Procedures and Subroutine; The Stack; The CALL Statement, PUSH, POP

WEEK 9 Starting March 9 - March 13 SPRING BREAK University is Closed

WEEK 10 Starting March 16 - March 20
Topics: PUSH, POP
Topics: Examples of how stacks are used in Computer Science
Assignment #5, #6;   Test #3 Procedures and Stacks

WEEK 11 Starting March 23 - March 27
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
Topics: How the computer really works; MOV, JMP, JNS Instruction implementation
Topics: CALL RET defined by Micro Operations

WEEK 12 Starting March 30 - April 3
Topics: How the computer really works; JNS Instruction implementation **WEEK 12**

WEEK 13 Starting April 6 - April 10
Topics: Computer Organization continued; PUSH and POP defined by Micro Operations

WEEK 14 Starting April 13 - April 17
Topics: Practice with Micro Operations
Test #4 Computer Organization

WEEK 15 Starting April 20 - April 24
Topics: Floating Point instructions and representation;

WEEK 16 Starting April 27 – May 1
Topics: Memory Arrays; Indirect addressing, arrays; Memory Mapped I/O
Examples of non-memory mapped I/O;   Machine I/O
Topics: Interrupts; Course Review

WEEK 17 FINAL EXAM WEEK OF May 4

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