

The Counseling Center at A&M-Commerce, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit [www.tamuc.edu/counsel](http://www.tamuc.edu/counsel)



## COCS 2325.01W

### Machine Language / Computer Organization

FALL 2022

#### INSTRUCTOR INFORMATION

**Instructor:** S. Saffer, Ph.D.

**Office Location:** JOUR 235

**Office Hours:** Communication by email is welcome at any time, including evenings, and weekends. Face to face conferences can be arranged through Zoom.

**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:

*The syllabus/schedule are subject to change.*

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.

## 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. Many of 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

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# **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).**

## **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.**

**PROGRAMMING ASSIGNMENT NOTE: Students must do their own programming assignments. It is OK to get help from a fellow student. It is NOT OK to turn in another's program as your own. That is plagiarism. Plagiarism is taken serious and will not be tolerated. Do not give your programming assignment to another student. If they turn it in as their own work, then both of you will receive a ZERO grade for that assignment and you will not be allowed to make it up.**

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## TECHNOLOGY REQUIREMENTS

### LMS

All course sections offered by Texas A&M University-Commerce have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:

<https://community.brightspace.com/s/article/Brightspace-Platform-Requirements>

LMS Browser Support:

[https://documentation.brightspace.com/EN/brightspace/requirements/all/browser\\_support.htm](https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm)

YouSeeU Virtual Classroom Requirements:

<https://support.youseeu.com/hc/en-us/articles/115007031107-Basic-System-Requirements>

## 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](mailto: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

*The syllabus/schedule are subject to change.*

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 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).  
<http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx>

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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)  
<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>

<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](mailto:studentdisabilityservices@tamuc.edu)

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Website: [Office of Student Disability Resources and Services](http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/)

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### **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.

### **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.

### **CAMPUS STATEMENT**

**A&M-Commerce requires the use of face-coverings in all instructional and research classrooms/laboratories. Exceptions may be made by faculty where warranted. Faculty have management over their classrooms. Students not using face-coverings can be required to leave class. Repetitive refusal to comply can be reported to the Office of Students' Rights and Responsibilities as a violation of the student Code of Conduct.**

**Students should not attend class when ill or after exposure to anyone with a communicable illness. Communicate such instances directly with your instructor. Faculty will work to support the student getting access to missed content or completing missed assignments.**

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# **COURSE OUTLINE / CALENDAR**

**COSC 2325 FALL 2022**

## **WEEK 1 AUGUST 29 - SEPTEMBER 2**

Review Numbering Systems, Two's Complement

Number representation; Conversions to and from BINARY OCTAL HEXADECIMAL DECIMAL; 2'S Complement; Logical Operators: AND OR NAND NOR NOT XOR

## **WEEK 2 SEPTEMBER 5 - SEPTEMBER 9**

Registers and Flip Flops

Elementary Instruction Formats; Opcodes Addresses;

PROGRAMMING in Assembly Language; Basic Assembly Language

Instructions MOV, ADD, SUB, INC, DEC

Prepare for Exam 1

## **WEEK 3 SEPTEMBER 12 - SEPTEMBER 16**

EXAM 1

## **WEEK 4 SEPTEMBER 19 - SEPTEMBER 23**

First Programs

Introduction to the process of Assembly and Linking. Writing the First Assembly Language program.

Instruction formats, Op Codes and Addresses, and basic instructions such as MOV, ADD, SUB, INC, DEC, etc. will be reviewed. Introduction to basic functions DumpRegs, DumpMem, WriteChar,

WriteString, ReadChar.

## **WEEK 5 SEPTEMBER 26 – SEPTEMBER 30**

Jumps and Flags

Unconditional Jumps and Conditional Jumps

The concept of Flags. Topics: The BIOSROM - History Lesson on 16 bit, 32 bit, 64 bit environments

Assignments: Program 1,2,3

## **WEEK 6 OCTOBER 3 - OCTOBER 7**

Carry and Overflow Assignments

Discussion of Homework Assignment 1,2,3,4,5,6

## **WEEK 7 OCTOBER 10 - OCTOBER 14**

Flag Exercises 1-7

EXAM 2

## **WEEK 8 OCTOBER 17 - OCTOBER 21**

Procedures

## **WEEK 9 OCTOBER 24 - OCTOBER 28**

Concepts of the Sack Push Pop

## **WEEK 10 OCTOBER 31 - NOVEMBER 4**

Using The Stack EXAM 3

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WEEK 11 NOVEMBER 7 - NOVEMBER 11

Computer Organization 1-3

Hardware design

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 12 NOVEMBER 14 - NOVEMBER 18

Computer Organization 4

The Ring Counter. Operations for Mov 1, Mov 2, JMP, JNS.

WEEK 13 NOVEMBER 21 – NOVEMBER 25

Computer Organization CALL PROC1 RET

WEEK 14 NOVEMBER 28 – DECEMBER 2

EXAM 4

WEEK 15 DECEMBER 5 – DECEMBER 9

Review

WEEK 16 DECEMBER 12 - DECEMBER 16

FINAL EXAM

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