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

CSCI 516.01B

Machine Language / Computer Organization

FALL 2024

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:

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). Assembly language programming. The concepts of the machine representation of instructions and data of a modern digital computer are presented. 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: CSCI 515.

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

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: CSCI 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).

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.**

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

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**.**

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.

The *syllabus/schedule are subject to change.*

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

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

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/

The *syllabus/schedule are subject to change.*

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.

COMMUNICATION AND SUPPORT

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

The *syllabus/schedule are subject to change.*

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

https://community.brightspace.com/support/s/contactsupport

Interaction with Instructor Statement

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures/Policies

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:
https://www.britannica.com/topic/netiquette

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

The *syllabus/schedule are subject to change.*

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
Undergraduate Student Academic Dishonesty Form

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/documents/13.99.99.R0.03UndergraduateStudentAcademicDishonestyForm.pdf

Graduate Student Academic Dishonesty Form

http://www.tamuc.edu/academics/graduateschool/faculty/GraduateStudentAcademicDishonestyFormold.pdf

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

Students with Disabilities-- ADA Statement

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
Velma K. Waters Library Rm 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.

The *syllabus/schedule are subject to change.*

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.

A&M-Commerce Supports Students' Mental Health

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**

Texas A&M University-Commerce acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. If no instructions are provided the student should assume that the use of such software is disallowed.

In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources.

The *syllabus/schedule are subject to change.*

13.99.99.R0.03 Undergraduate Academic Dishonesty
https://inside.tamuc.edu/aboutus/policiesproceduresstandardsstatements/rulesprocedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf

13.99.99.R0.10 Graduate Student Academic Dishonesty
https://inside.tamuc.edu/aboutus/policiesproceduresstandardsstatements/rulesprocedures/13students/graduate/13.99.99.R0.10.pdf

COURSE OUTLINE / CALENDAR

CSCI 516 FALL 2024

WEEK 1 MODULE 1 AUGUST 26 – AUGUST 30
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 MODULE 2 SEPTEMBER 2 - SEPTEMBER 6
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 MODULE 3 SEPTEMBER 9 - SEPTEMBER 13
EXAM 1

WEEK 4 MODULE 4SEPTEMBER 16 - SEPTEMBER 20
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 MODULE 5 SEPTEMBER 23 – SEPTEMBER 27
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 MODULE 6 SEPTEMBER 30 - OCTOBER 4
Carry and Overflow Assignments
Discussion of Homework Assignment 1,2,3,4,5,6

The *syllabus/schedule are subject to change.*

WEEK 7 MODULE 7 OCTOBER 7 - OCTOBER 11
Flag Exercises 1-7
EXAM 2

WEEK 8 MODULE 8 OCTOBER 14 - OCTOBER 18
Procedures

WEEK 9 MODULE 9 OCTOBER 21 - OCTOBER 25
Concepts of the Sack Push Pop

WEEK 10 MODULE 10 OCTOBER 30 - NOVEMBER 1
Using The Stack EXAM 3

WEEK 11 MOCULE 11 NOVEMBER 4 - NOVEMBER 8
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 MODULE 12 NOVEMBER 11 - NOVEMBER 15
Computer Organization 4
The Ring Counter. Operations for Mov 1, Mov 2, JMP, JNS.

WEEK 13 MODULE 13 NOVEMBER 18 – NOVEMBER 22
Computer Organization CALL PROC1 RET

WEEK 14 MODULE 14 NOVEMBER 25 – NOVEMBER 29
THANKSGIVING HOLIDAY
EXAM 4

WEEK 15 DECEMBER 2 – DECEMBER 6
Review

WEEK 16 DECEMBER 9 - DECEMBER 13
FINAL EXAM