

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: **MICRO COMPUTER SYSTEMS II**

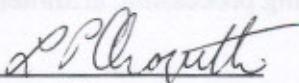
Code No.: **CET226-5** Semester: **Fourth (4)**

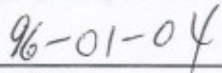
Program: **COMPUTER ENGINEERING TECHNOLOGY**

Author: **Professor Peter Savich**

Date: **January 1996** Previous Outline Dated: **January 1995**

APPROVED:


Dean


Date

Total Credits: **5**

PREREQUISITE(S): **CET127**

LENGTH OF COURSE: **16 weeks**

TOTAL CREDIT HOURS: **64**

RECEIVED

Course Name:
MICROCOMPUTER SYSTEMS II

Course No.
CET226-5

I. COURSE DESCRIPTION:

This course develops a student's ability to use assembly language in a PC environment effectively. It follows an earlier course, CET127 which developed a basic familiarity with the 8088/8086 instruction set, addressing modes and programming.

CET226 expands upon this by developing an understanding of the use of BIOS and DOS interrupts to interact with the keyboard, screen, printer and diskette services. In addition, arithmetic processing, string processing, table searching, sorting, the use of procedures, macros and linking to high-level languages are covered.

II. LEARNING OUTCOMES AND ELEMENTS OF PERFORMANCE:

(Generic Skills Learning Outcomes placement on the course outline will be determined and communicated at a later date)

A. Learning Outcomes:

1. Demonstrate proficiency at writing programs in Assembly Language, utilizing Turbo Assembler/Debugger, and utilizing assembler macros and macro libraries.
2. Write programs that require array and string processing, arithmetic processing, table searching, and/or sorting.
3. Describe the software interrupt mechanism used in the 8088/8086 family.
4. Write programs that utilize DOS and BIOS services for performing screen and keyboard I/O.
5. Write programs that utilize DOS and BIOS services for performing disk I/O. Write programs that utilize DOS and BIOS for controlling the printer.
6. Combine assembled object files into a library and link them with a program written in a High Level Language.

B. Learning Outcomes with Elements of Performance:

Upon successful completion of this course the student will demonstrate the ability to:

1. Demonstrate proficiency at writing programs in Assembly Language, utilizing Turbo Assembler/Debugger, and utilizing assembler macros and macro libraries.

Elements of the performance:

- Edit, assemble, link, and debug using Turbo debug
 - Use procedures when writing programs
 - Call procedures near and far
 - write macros and add macros to the macro library
2. Write programs that require array and string processing, arithmetic processing, table searching, and/or sorting.

Elements of the performance:

- Write procedures that will convert numbers ASCII to binary, and binary to ASCII
- Use a sorting routine (Shell or Bubble sort) to sort an array
- Write procedures to perform string manipulation

3. Describe the software interrupt mechanism used in the 8088/8086 family.

Elements of the performance:

- Calculate the vector address for any of the interrupt service routines
- Draw the layered model for your program, DOS, BIOS, and the I/O hardware
- Discuss what happens when the INT instruction executes: registers, stack, vector table

4. Write programs that utilize DOS and BIOS services for performing screen and keyboard I/O.

Elements of the performance:

- display messages on the screen using DOS interrupt 21H function calls

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- enter characters via the keyboard using DOS interrupt 21H function calls
 - use the BIOS interrupts for keyboard input and screen output
5. Write programs that utilize DOS and BIOS services for performing disk I/O. Write programs that utilize DOS and BIOS for controlling the printer.

Elements of the performance:

- delete files using DOS and BIOS services
 - use File Control Blocks and File handles for disk processing
 - use BIOS services for reading disk tracks and sectors
 - write programs that utilize DOS and BIOS services for performing I/O with the disk drive
 - search for a specific string giving sector number to start search and number of sectors to search
6. Combine assembled object files into a library and link them with a program written in a High Level Language.

Elements of the performance:

- write main module in the high level language 'C' and call the assembly sub procedures from the 'C' program
- assemble and link separately compiled OBJECT modules
- employ various techniques for passing parameters between modules
- write programs that demonstrate calling and passing parameters between a high level language and assembly language written modules
- utilize a librarian to maintain separately assembled modules and utilize the linker to link against the library
- write procedures that control the mouse using INT 33H
- discuss the difference between COM and EXE files
- discuss the Program Segment Prefix and how to use the PSP to obtain command line parameters
- write a program that demonstrates the use of the PSP to obtain command line parameters

III. TOPICS TO BE COVERED:

Note: These topics sometimes overlap several areas of skill development and are not necessarily intended to be explored in isolated learning units or in order below.

1. Language Fundamentals And Addressing Modes (Review)
2. Debugging Features Of Turbo Debug
3. Macros And Macro Libraries
4. Array And String Handling
5. Interrupts
6. Screen Output And Keyboard Input
7. Disk Input/output And File Handling
8. Printer Control
9. Separately Assembled Object Modules / Libraries
10. Com Vs Exe Program Files

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

1. Textbook: "Assembly Language for the IBM - PC 2nd Edition"
by Kip R. Irvine, Publisher Macmillan
2. Diskettes: at least 3 3-1/2" HD disks
3. Handout: 8088 INSTRUCTION SET SUMMARY

ADDITIONAL RESOURCE MATERIALS AVAILABLE:

MS-DOS Programmers Reference, IBM ROM BIOS Programmer's Quick Reference, IBM DOS Functions Programmer's Quick Reference

V. EVALUATION PROCESS/GRADING SYSTEM:

MAJOR ASSIGNMENTS AND TESTING

2 THEORY TESTS (30% each)	60%
ASSIGNMENTS	25%
QUIZZES AND PRACTICAL TESTS	15%

(The percentages shown above may have to be adjusted to accurately evaluate student skills. Students will be notified of any changes made.)

TESTS

Written tests will be announced about one week in advance. Quizzes may be conducted without advance warning. No "re-write" opportunities exist for quizzes not written.

ASSIGNMENTS AND LAB ACTIVITIES:

Lab activities and assignments represent a very important component of this course in which practical 'hands-on' skills will be developed. Because of this, **lab attendance is mandatory** and the satisfactory completion of all assignments is required. It is the student's responsibility to discuss absences from regularly scheduled labs with the instructor so that alternate arrangements (where possible) can be made to complete the lab requirements.

A penalty for late assignments will be applied unless there are extenuating circumstances. A 10% per week penalty will be applied. After 4 weeks late assignments will not be accepted for credit.

It is acceptable that students consult with each other in relation to their assigned problems. However, it is unacceptable to copy programs written by someone else and submit them as your own work. Where plagiarism or copying is found and it is impossible to determine whose original work it is, a mark of zero will be assigned to all assignments involved.

ATTENDANCE:

Absenteeism will affect a student's ability to succeed in this course. Absences due to medical

or other unavoidable circumstances should be discussed with the instructor, so that remedial activities can be scheduled. A Quiz or Test missed because of an unauthorized absence will result in a zero grade being assigned.

METHOD OF ASSESSMENT (GRADING METHOD)

The following letter grades will be assigned in accordance with the School of Engineering policies:

A+	90% - 100%	outstanding achievement
A	80% - 89%	above average achievement
B	70% - 79%	average achievement
C	55% - 69%	satisfactory achievement
U		unsatisfactory given at midterm only
S		satisfactory given at midterm only
R		repeat
X		a temporary grade that is limited to instances where special circumstances have prevented the student from completing objectives by the end of the semester. An "X" grade must have the Dean's approval and has a maximum time limit of 120 days.

NOTE: Students may be assigned an "R" grade early in the course for unsatisfactory performance.

UPGRADING OF INCOMPLETES

When a student's course work is incomplete or final grade is below 55%, there is the possibility of upgrading to a pass when a student meets the following criteria:

1. The student's attendance has been satisfactory.
2. An overall average of at least 40% has been achieved.
3. The student has not had a failing grade in all of the theory tests taken.
4. The student has made reasonable efforts to participate in class and complete assignments.

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VI. SPECIAL NOTES

1. All students should be aware of the Special Needs Office in the college. If you have any special needs such as being visually impaired, hearing disabled, physically disabled, learning disabilities you are encouraged to discuss required accommodations confidentially with the Professor and/or contact the Special Needs Office, Room E1204, Ext 493, or 717, or 491 so that support services can be arranged for you.
2. Your Professor reserves the right to modify the course as he/she deems necessary to meet the needs of students.
3. It is the responsibility of the student to retain all course outlines for possible future use in gaining advanced standing at other post-secondary.
4. Plagiarism
Students should refer to the definition of "academic dishonesty" in the "Statement of Student Rights and Responsibilities". Students who engage in 'academic dishonesty' will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course, as may be decided by the professor.
5. Substitute course information is available at the Registrar's office.

VII. PRIOR LEARNING ASSESSMENT:

This course is currently not PLA'ble . The student must take the course in its entirety.

