

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: MICROPROCESSOR PROGRAMMING

CODE NO.: CET 127 - 4

PROGRAM: COMPUTER ENGINEERING
TECHNICIAN / TECHNOLOGIST

SEMESTER: TWO

AUTHOR: PETER SAVICH

DATE: JANUARY 1990

PREVIOUS OUTLINE
DATED: JANUARY 1989
BY TYCHO BLACK

APPROVED:

P. Savich
DEAN

90/02/06
DATE

COURSE NAME:

CODE NO.:

MICROPROCESSOR PROGRAMMING

CET 127 - 4

TOTAL CREDIT HOURS: 60

LENGTH OF COURSE: 4 HOURS PER WEEK FOR 15 WEEKS

TWO 1 HOUR THEORY CLASSES
ONE 2 HOUR LAB CLASS

PREREQUISITE(S): NONE

I. PHILOSOPHY / GOALS

THE OBJECTIVE OF THIS COURSE IS TO INTRODUCE THE STUDENT TO THE 8088 ASSEMBLY LANGUAGE PROGRAMMING. AS A FIRST COURSE IN ASSEMBLY LANGUAGE PROGRAMMING IT IS NECESSARY TO STUDY NUMBER SYSTEMS, REGISTERS, ADDRESSING MODES AND INSTRUCTION EXECUTION IN A THOROUGH MANNER BEFORE DEVELOPING SIGNIFICANT PROGRAMMING SKILLS IN SUBSEQUENT COURSES.

INITIALLY THE CONCENTRATION IS ON THE USE OF DEBUG, AN INTERACTIVE DEBUGGING UTILITY ON THE IBM PC MICROCOMPUTER. LATER, THE USE OF MACRO ASSEMBLER (MASM) IS USED ALONG WITH THE LINKER TO ASSEMBLE, LINK AND RUN EXECUTABLE PROGRAMS.

COURSE NAME:

CODE NO.:

MICROPROCESSOR PROGRAMMING

CET 127 - 4

II THRU IV SPECIFIC COURSE OBJECTIVES

SPECIFIC OBJECTIVES

CET127

STUDENTS WILL DEMONSTRATE SIGNIFICANT UNDERSTANDING OF THE FOLLOWING TOPICS:

BLOCK 1: INTRODUCTION AND NUMBER SYSTEMS (CHAP. 1,2)

1. GENERAL MICROCOMPUTER SYSTEM ARCHITECTURE.
2. BUS ORGANIZATION IN TYPICAL MICROCOMPUTER SYSTEMS.
3. THE EVOLUTION OF MICROPROCESSOR TECHNOLOGY.
4. ASSEMBLY LANGUAGE PROGRAMMING: ITS NATURE, ADVANTAGES AND DISADVANTAGES.
5. NUMBER SYSTEMS: BINARY, HEXADECIMAL, OCTAL.
6. NUMBER SYSTEM CONVERSIONS.
7. TWO'S COMPLEMENT NUMBERS AND ADDITION AND SUBTRACTION OF BINARY AND HEXADECIMAL NUMBERS.
8. BCD AND ASCII CODES.
9. PARITY.

COURSE NAME:

MICROPROCESSOR PROGRAMMING

CODE NO.:

CET 127 - 4

BLOCK 2: SOFTWARE ARCHITECTURE OF THE 8088 MICROPROCESSOR
(CHAP. 3)

1. SOFTWARE MODEL OF THE 8088 MICROPROCESSOR.
2. SYSTEM MEMORY ADDRESS SPACE.
3. THE 8088 REGISTERS.
4. MEMORY SEGMENTATION: PHYSICAL AND LOGICAL ADDRESSES.
5. THE STACK IN 8088 SYSTEMS.
6. I/O ADDRESS SPACE IN 8088 SYSTEMS.
7. 8088 ADDRESSING MODES.

COURSE NAME:

CODE NO.:

MICROPROCESSOR PROGRAMMING

CET 127 - 4

BLOCK 3: MACHINE LANGUAGE CODING AND THE USE OF "DEBUG"
(CHAP. 4)

1. CONVERTING ASSEMBLY LANGUAGE INSTRUCTIONS TO MACHINE LANGUAGE.
2. THE USE OF THE DEBUG PROGRAM ON THE IBM-PC TO EXAMINE AND MODIFY THE CONTENTS OF MEMORY AND REGISTERS, TO LOAD AND SAVE MACHINE CODE PROGRAMS ON DISK, TO ASSEMBLE AND UNASSEMBLE INSTRUCTIONS, TO EXECUTE AND SINGLE-STEP PROGRAMS.

BLOCK 4: ASSEMBLY LANGUAGE PROGRAM DEVELOPMENT (CHAP.5)

1. ASSEMBLY LANGUAGE PROGRAM DEVELOPMENT ON THE IBM-PC.
2. MASM (MACRO ASSEMBLER) STATEMENT SYNTAX, PSEUDO OPERATIONS.
3. GENERATION OF ASSEMBLER SOURCE FILES WITH AN EDITOR.
4. GENERATING RUN MODULES USING LINK.
5. LOADING AND EXECUTING RUN MODULES WITH DEBUG.

BLOCK 5: 8088 MICROPROCESSOR PROGRAMMING (CHAP 6,7)

1. THE STUDENT WILL BE INTRODUCED TO THE OPERATION OF THE FOLLOWING GROUPS OF INSTRUCTIONS AND THEIR PROPER UTILIZATION IN SIMPLE PROGRAMS:
 - A) DATA TRANSFER INSTRUCTIONS
 - B) ARITHMETIC INSTRUCTIONS
 - C) LOGIC INSTRUCTIONS
 - D) SHIFT AND ROTATE INSTRUCTIONS
 - E) FLAG-CONTROL INSTRUCTIONS
 - F) COMPARE INSTRUCTIONS
 - G) JUMP AND LOOP INSTRUCTIONS
 - H) SUBROUTINE HANDLING
 - I) STRING INSTRUCTIONS

COURSE NAME:

CODE NO.:

MICROPROCESSOR PROGRAMMING

CET 127 - 4

V. METHOD(S) OF EVALUATION

1.

THE STUDENT WILL BE ASSESSED THROUGH A SERIES OF THREE (3) WRITTEN TESTS. THESE TESTS WILL EACH BE WEIGHTED TO 20% OF THE FINAL MARK.

THE TENTATIVE DATES ARE: MAR 5 /90
APR 3 /90
MAY 19/90

THESE TEST DATES WILL BE RE-ANNOUNCED APPROXIMATELY ONE WEEK IN ADVANCE.

2.

THE STUDENT WILL BE ASSESSED THROUGH A SERIES OF UNANNOUNCED QUIZZES. THE TOTAL WEIGHT OF THESE QUIZZES ARE NOT TO EXCEED 10% OF THE FINAL MARK.

3.

THE STUDENT WILL BE ASSESSED THROUGH A SERIES OF LAB ASSIGNMENTS. COLLECTIVELY THESE ASSIGNMENTS WILL BE WEIGHTED TO 25% OF THE FINAL MARK.

4.

THE STUDENT WILL BE ASSESSED ON HIS/HER ABILITY TO ANSWER QUESTIONS ABOUT THE LAB ASSIGNMENT ONCE SUBMITTED. THE STUDENT'S RESPONSE TO THESE LAB DEMONSTRATION QUESTIONS WILL BECOME PART OF HER/HIS "PRACTICAL DEMONSTRATION" MARK. THIS MARK WILL BE WEIGHTED TO 5% OF THE FINAL MARK.

5.

THE STUDENT ATTENDING MORE THAN 80% OF THE TIME WILL RECEIVE A BONUS OF 2%.

COURSE NAME:

CODE NO.:

MICROPROCESSOR PROGRAMMING

CET 127 - 4

SUMMARY OF FINAL MARK

1.	TESTS	60%
2.	QUIZZES	10%
3.	ASSIGNMENTS	25%
4.	DEMOS	5%

		100%
5.	ATTENDANCE	2% BONUS ONLY

COURSE GRADING SCHEME

A+	90+	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.

COURSE NAME:

MICROPROCESSOR PROGRAMMING

CODE NO.:

CET 127 - 4

3. 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 THE STUDENT'S PERFORMANCE WARRANTS IT. ATTENDANCE AND ASSIGNMENT COMPLETION WILL HAVE A BEARING ON WHETHER UPGRADING WILL BE ALLOWED. A "REPEAT" GRADE ON ALL TESTS WILL REMOVE THE OPTION OF ANY UPGRADING AND AN "R" GRADE WILL RESULT. THE HIGHEST ON A REWRITTEN TEST OR ASSIGNMENT WILL BE 56%.

THE METHOD OF UPGRADING IS AT THE DISCRETION OF THE TEACHER AND MAY CONSIST OF ONE OR MORE OF THE FOLLOWING OPTIONS:

ASSIGNED MAKE-UP WORK
RE-DOING PROJECTS
RE-DOING OF TESTS
WRITING OF COMPREHENSIVE SUPPLEMENTAL EXAMINATION

COURSE NAME:

CODE NO.:

MICROPROCESSOR PROGRAMMING

CET 127 - 4

VI. REQUIRED STUDENT RESOURCES

THE TEXT REQUIRED TO BE PURCHASED BY STUDENTS IS:

1.

IBM PC/8088 ASSEMBLY LANGUAGE PROGRAMMING
BY A. SINGH AND W.A. TRIEBEL
PUBLISHER PRENTICE-HALL

2.

COURSE NOTES PROVIDED BY THE INSTRUCTOR (NOT TO BE PURCHASED)

3.

THE STUDENTS WILL ALSO BE EXPECTED TO PURCHASE APPROXIMATELY 10
FLOPPY DISKS 5 AND ONE QUARTER INCH, DOUBLE SIDED, DOUBLE
DENSITY.

VII. ADDITIONAL RESOURCE MATERIALS (AVAILABLE IN COLLEGE
LIBRARY)

THERE ARE MANY OTHER BOOKS ON 8088 PROGRAMMING, OTHER
MICROPROCESSORS, ETC.

VIDEO TAPES: THE ONTARIO TV SERIES: THE EDUCATION OF MIKE
MACMANNIS. THE 13 PART SERIES COMPUTERS AND
COMPUTER LITERACY.

PERIODICALS: THERE ARE PC MAG, BYTE MAG, COMPUTING CANADA

COURSE NAME:

CODE NO.:

MICROPROCESSOR PROGRAMMING

CET 127 - 4

VIII. SPECIAL NOTES

INSTRUCTORS (PROFESSORS) RESERVE THE RIGHT TO MAKE CHANGES TO THE
COURSE OUTLINES WHERE NECESSARY