

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: COMPUTER SYSTEMS

CODE NO.: CET 306-6

PROGRAM: ELECTRICAL/ELECTRONIC

SEMESTER: FIVE

DATE: SEPTEMBER, 1987

TEACHING MASTER: PETER SAVICH

APPROVED:

NEW
P. Savich
CHAIRPERSON

REVISION
88/09/02
DATE

CET 306

COMPUTER SYSTEMS

PHILOSOPHY / GOALS

THE OBJECTIVES OF THIS COURSE ARE TO PROVIDE THE STUDENT WITH A KNOWLEDGE OF THE PDP-11 FAMILY OF COMPUTERS AND THE PRACTICAL EXPERIENCE OF PROGRAMMING IN ASSEMBLY LANGUAGE USING THE PDP-11 COMPUTERS.

THE STUDENT WILL BECOME PROFICIENT IN WRITING ASSEMBLY PROGRAMS USING THE EDITOR AVAILABLE FOR BOTH THE MULTI-TASKING OPERATING SYSTEM CALLED RSX-11M AND THE SINGLE USER OPERATING SYSTEM CALLED RT-11. THE STUDENT SHOULD THEN BE CAPABLE OF ASSEMBLING, LINKING, RUNNING AND DEBUGGING THE PROGRAMS. UPON COMPLETION OF THE EXAMINATION OF THE VARIOUS ADDRESSING MODES; TRANSLATION OF MNEUMONICS INTO MACHINE CODE; STRUCTURING OF ALL PROGRAMS TO CONFORM TO STANDARDS; AND SUBMISSION OF SEVERAL MODULAR PROGRAMS, THE STUDENT SHOULD BE PREPARED TO DEMONSTRATE MORE COMPLEX BUT REALISTIC APPLICATIONS REQUIRING THE USE OF THE ASSEMBLY LANGUAGE. PERIPHERALS SUCH AS A/D, D/A, CLOCK/COUNTERS WILL BE EMPLOYED TO CONTROL SERVO-MOTORS. TRAPS, INTERRUPTS, AND POLLING TECHNIQUES FOR USE IN CONTROL OF THE PERIPHERALS WILL BE EMPLOYED.

METHOD OF ASSESSMENT

1.

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

THE TENTATIVE DATES ARE: OCT 5 /88
NOV 3 /88
DEC 19/88

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

2.

THE STUDENT WILL BE ASSESSED THROUGH A SERIES OF UNANNOUNCED QUIZES. THE TOTAL WEIGHT OF THESE QUIZES 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 THEIR ABILITY TO ANSWER QUESTIONS ABOUT THE LAB ASSIGNMENT ONCE SUBMITTED. THE STUDENT'S RESPONSE TO THESE LAB DEMONSTRATION QUESTIONS WILL BECOME PART OF THEIR "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%.

SUMMARY OF FINAL MARK

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

100%

5.	ATTENDANCE	2% BONUS ONLY
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COURSE GRADING SCHEME

A+	90+	OUTSTANDING ACHEIVEMENT
A	80 - 89	ABOVE AVERAGE ACHEIVEMENT
B	70 - 79	AVERAGE ACHEIVEMENT
C	55 - 69	SATISFACTORY ACHEIVEMENT
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 CHAIRPERSON'S APPROVAL AND HAS A MAXIMUM TIME LIMIT OF 120 DAYS.

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 FAILING GRADE ON ALL TESTS WILL REMOVE THE OPTION OF ANY UPGRADING AND AN "R" GRADE WILL RESULT. THE HIGHEST ON A RE-WRITTEN 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
- WRITTING OF COMPREHENSIVE SUPPLEMENTAL EXAMINATION

TEXTBOOK FOR CET 306

"MACRO-11 ASSEMBLY LANGUAGE" BY C.J. HWANG, D.E. GIBSON

COURSE OUTLINE

BLOCK I SYSTEM ARCHITECTURE AND MACHINE LANGUAGE PROGRAMMING

AT THE END OF THIS BLOCK THE STUDENT SHOULD BE CAPABLE OF:

1. DESCRIBING THE HARDWARE COMPONENTS OF A COMPUTER SYSTEM USING BLOCK DIAGRAMS.
2. DISCUSSING THE ARCHITECTURE OF THE PDP-11 FAMILY OF COMPUTERS USING SCHEMATICS.
3. DESCRIBING THE OPERATION AND USE OF ALL THE ADDRESSING MODES AVAILABLE TO THE PDP-11 FAMILY OF COMPUTERS.
4. HIGHLIGHTING THE VARIOUS OPERATING SYSTEMS DESIGNED FOR USE ON THE PDP-11 FAMILY OF COMPUTERS.
5. WRITING AND DISCUSSING THE INTENTION OF ANY SIMPLE INSTRUCTION FROM THE MACRO-11 ASSEMBLY INSTRUCTION SET.
6. EDITING, ASSEMBLING, LINKING, RUNNING, AND DEBUGGING SIMPLE PROGRAMS.
7. USING THE ODT TECHNIQUE TO SET BREAKPOINTS, ALTER REGISTER CONTENTS, ALTER MEMORY ADDRESS CONTENTS, SINGLE & MULTI STEP THROUGH A PROGRAM, AND UTILIZE RELOCATION REGISTERS.
8. CONVERTING FROM MNEMONICS TO MACHINE CODE OCTAL INSTRUCTIONS.

NOTE: SOME OF THIS MATERIAL WAS COVERED IN THE FOURTH SEMESTER COURSE CET225. THE REVIEW WILL INSURE ALL STUDENTS ARE PREPARED FOR SUBSEQUENT BLOCKS.

ANTICIPATED LENGTH OF BLOCK: FIVE WEEKS

BLOCK II SUBROUTINES, MACROS AND LIBRARIES

AT THE END OF THIS BLOCK THE STUDENT SHOULD GAIN SOME VALUABLE EXPERIENCE IN THE FOLLOWING AREAS:

1. USING SUBROUTINES AND MACROS TO MODULARIZE MORE COMPLEX PROGRAMS.
2. LINKING AND MAPPING OF SEPARATE FILES FOR THE RUNNING OF PROGRAMS.
3. USING THE LIBRARIAN TO CREATE AND MAINTAIN A LIBRARY OF BOTH MACRO AND OBJECT MODULES.
4. LINKING OF SEPARATE HIGH LEVEL LANGUAGES WITH LOW LEVEL ASSEMBLY LANGUAGES FOR THE RUNNING OF PROGRAMS.

ANTICIPATED LENGTH OF BLOCK: FOUR WEEKS

BLOCK III PERIPHERALS

AT THE END OF THIS BLOCK THE STUDENT SHOULD HAVE EXPERIENCE WITH THE THREE MAIN PERIPHERALS: A/D; D/A; AND THE CLOCK/COUNTER. THESE PERIPHERALS ARE AVAILABLE ON THE LSI-11 AND M/INC PDP-11 COMPUTERS WHICH USE THE RT-11 OPERATING SYSTEM. THE STUDENT SHOULD BE ABLE TO:

1. USING THE CONTROL STATUS REGISTERS, WRITE SIMPLE ROUTINES FOR KEYBOARD INPUT AND CONSOLE OUTPUT OF ASCII CHARACTERS.
2. UNDERSTAND THE DIFFERENCE BETWEEN INTERRUPTS AND POLLING TECHNIQUES.
3. DEMONSTRATE DEBUGGING TECHNIQUES FOR THE RT-11 OP/SYS.
4. WRITE LARGER PROGRAMS THAT CONTROL SMALL MOTORS SPEED AND DIRECTION.
5. WRITE PROGRAMS THAT WILL PERMIT DATA TRANSFERS USING THE DIGITAL INPUT/ OUTPUT REGISTERS OF THE M/INC PDP-11 COMPUTER. STUDENTS MAY THEN COMMUNICATE WITH OTHER MICROCOMPUTERS WHICH MAY HAVE THE 6800, 8088, OR LSI-11 MICROPROCESSORS.
6. USING THE D/A AND THE A/D CONVERTORS WRITE A MESSAGE USING AN OSCILLISCOPE.

NOTE: THE STUDENT WILL HAVE TO LEARN HOW TO USE "SMARTTERM" IN ORDER TO USE THE LAB FACILITIES IN ROOM A40. THIS SOFTWARE PACKAGE IS NOT PART OF THE ASSEMBLY LANGUAGE BUT ALLOWS US TO USE THE IBM PC AS THE EMULATOR FOR THE M/INC PDP-11 COMPUTERS WE DO HAVE.

ANTICIPATED LENGTH OF BLOCK: SIX WEEKS