SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title:	COMPUTER SYSTEMS II
Code No.:	CET 220
Program:	COMPUTER ENGINEERING TECHNOLOGY
Semester:	4
Date:	JANUARY 1985
Author:	PETER SAVICH

New: X Revision: _____

APPROVED: J.P. Draziotto
Chairperson

Date

ET 220

COMPUTER SYSTEMS II

PHILOSOPHY/ GOALS:

The objectives of this course are to provide the student with:

1. In depth knowledge of the PDP-11 family of computers.

   Specifically, the RT-11 operating system will be investigated: peripheral devices such as the A/D convertor, D/A convertor, real-time clock and the digital input-output (I/O).

   The student should be able to describe the use of interrupts and traps and write programs to use those facilities.

2. The student will be introduced to the VAX-11 family of computers. Upon completion of this study, the student will be able to sketch a block diagram of a VAX family system, identify the units and system components. Hardware units such as the central processing unit (CPU), cache memory, UNIBUS, floppy disks will be examined in depth.

The virtual memory system (VMS) operating system will be examined in detail. The mechanics of virtual storage and how it works will be studied. Scheduling and swapping in a multiprogramming environment will be discussed.

Method of Assessment:

1.

RT-11 Operating System experiments into interrupt programming will be worth 20% of the final mark in CET200.

2.

Floating point programming will be worth 10% of the final mark.

3.

Major tests will be given throughout the course with prior advance notice. Tests and quizes will constitute 70% of the final mark.

Rewrites policy and grading procedure are described below and conform to college policy.

EVALUATION PROCEDURES

COURSE:

1. TESTS

Written tests will be conducted as deemed necessary but will usually be announced about one week in advance. Quizzes may be conducted without advance notice.

2. The following grading scheme will be used:

A	76-100 %
B	66-75
C	55-65
X	
R	Repeat

3. An X grade will require upgrading prior to continuing in the program whenever that course is a prerequisite for a future course. An X grade not upgraded reverts to an R.

4.Upgrading of Incompletes:

The method of upgrading is completely at the discretion of the teacher and may consist of one or more of the following options; assigned make-up work,completing or repeating lab activities or assignments, the re-writing of block tests, the writing of a comprehensive supplemental exam. With the absence of a formal make-up period at the end of the semester, it is very difficult to meet individual student needs for remedial work and therefore it is now especially important to not count on a make-up period as a second chance to succeed,because success at this point demands a firm committment to learning.

Where a student's overall performance has been consistently unsatisfactory, an R grade may be assigned without the option of make-up work.

Attendance and assignment completion may have a bearing on whether make-up work to upgrade an X grade will be allowed.

The highest grade obtainable on a re-write test is 55%.

The following grade symbols have been approved for use in recording grades for the academic year for all post-secondary and non-semestered students.

"A" - outstanding achievement
"B" - consistently above average achievement
"C" - satisfactory or acceptable achievement in areas subject to assessment
"I" - incomplete - course work not completed by mid-term assessment but expected to be complete by semester end.
NOTE: the "I" grade is acceptable at mid-term only. It is NOT an approved grade for end of term reporting and will not be recorded at the end of a semester.
"R" - Repeat - the student has not achieved the objectives of the course and the course must be repeated.
"X" - a temporary grade that is limited in use to rare instances when no other grade will ensure justice. The "X" grade may not be assigned unless accompanied by a written authorization from the Department Chairman. Time allowed for completing course requirements will not exceed 120 calendar days beyond the end of the semester in which it is assigned, and should only be used at the end of a term. If the final grade for the course is not received in the Admissions & Academic Records Office by the date indicated on the authorization, the "X" will revert to an "R".

Textbooks:

Programming in Assembly Language: MACRO 11

by SOWELL, Edward F., 1984, Addison Wesley

References:

PDP-11 Microcomputer Interfaces Handbook, 1983, Digital Equipment.

Introduction to VAX-11: Concepts, 1978, Digital Equipment Corp.

VAX-11/780 Technical Summary

VAX-11/780 Software Handbook

Computer Programming and Architecture The VAX 11

by Henry M. Levy, Richard H. Eckhouse, Jr., 1980, Digital Equip Corp.

COURSE OUTLINE

BLOCK I RT-11 OPERATING SYSTEM INTERRUPT PROGRAMMING

1. Describe the organization of the I/O peripheral devices

2. Discuss the difference in the I/O structure between RT-11 and RSX-11 Operating Systems.

3. Describe the use of interrupts and traps and write programs to use those facilities.

BLOCK II VAX/VMS PROGRAMMING

1. System architecture is described for the VAX-11 family. Upon completion of this study unit, students are expected to be able to describe the following system components:

central processing unit

cache memory

floating point accelerator

writable diagnostic control store (WDCS)

main memory subsystem

MOS memory

memory controllers

Synchronous Backplane Interconnect

UNIBUS

UNIBUS adapter

general purpose peripherals

MASSBUS

MASSBUS adapters

mass storage peripherals

console terminal

microcomputer

floppy disk

2. Name the VAX-11/780 hardware unit described by each statement in the list above, and describe the function performed.

3. Name the VAX-11/780 operating mode given the distinguishing characteristics of the particular hardware unit employed.

4. VAX/VMS Operating System will be researched.

After completing the block, students will be able to:

define any process and list its 3 component parts
distinguish between programs, images, processes and jobs
draw the 5 state model of a process
identify terms associated with mapping virtual address space into main memory or auxiliary storage
distinguish between virtual address and a physical address
identify the function of certain page table enteries
discuss any and all terms associated with paging
name 2 types of thrashing and the 2 methods for controlling it
list advantages of virtual memory
name the factors involved in process scheduling
use priority, priority adjustment, and quantun control
name 3 factors affecting swapping
identify balance set, scatter/gather, balance at quantum
distinguish swapping from paging
distinguish balance set from working set
name the 2 facilities provided for interprocess communication control of processes, and control of a process' memory management

BLOCK III FLOATING POINT PROGRAMMING

1. Describe how the operation and use of the following floating point instructions are carried out in the fp11 coprocessor:

SETL	
	LDEXP
SUBF	LDCIF, LDCID
MULF	LDCLF, LDCLD
ADDF	LDCDF, LDCFD
DIVF	STEXP

2. Describe some of the capabilities of system subroutines used for data conversion.