

**SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY**

SAULT STE. MARIE, ONTARIO

**COURSE OUTLINE**

Course Title: **STRUCTURED PROGRAM DEVELOPMENT**

Course No.: **CET129**

Program: **COMPUTER ENGINEERING TECHNOLOGY**

Semester: **SECOND(2)**

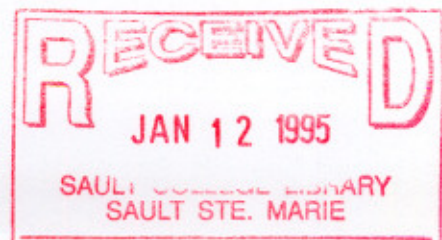
Date: **JANUARY 1995**

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Dean

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Date



STRUCTURED PROGRAM DEVELOPMENT

CET129

C O U R S E O U T L I N E

PREREQUISITES: CET106

LENGTH OF COURSE: 4 HOURS PER WEEK FOR 16 WEEKS

TOTAL CREDITS: 4

I. PHILOSOPHY/GOALS

This course is intended to provide the student with a firm base of VAX/VMS concepts and structured programming concepts. The student is also taught the fundamentals of VAX usage through the study of DCL programming techniques and the use of VAX utilities. Throughout this course we will attempt to focus our energy on ensuring that we take the time to solve the problems in our mind and on paper prior to sitting down and coding. Experience has shown that a student who takes the time to really understand the problem and follows structured programming techniques saves time in the long run and becomes a better programmer. The student applies structured programming concepts to more complex problems and will improve his/her skills in the Fortran programming language.

II. STUDENT PERFORMANCE OBJECTIVES (OUTCOMES):

Upon successful completion of this course the student will:

1. Demonstrate structured problem solving by using a variety of tools and techniques.
2. Develop structured problem solving and program debugging skills by using manual debugging techniques as well as the VAX Symbolic Debugger.
3. Develop a modular approach to programming by using a variety of tools and techniques such as functions, subroutines, and libraries.
4. Use arrays, string processing, file input/ output and error handling to solve more complex problems.
5. Develop command procedures by using a variety of DCL commands.

III. TOPICS TO BE COVERED

This particular course is an extension of CET106 which introduces the student to VAX/VMS and programming. It follows where that particular course ends and covers in detail the following topics:

	<u>TOPIC:</u>	<u>APPROXIMATE TIME</u>
1.	Structured approach to problem solving.	2 WKS
2.	Debugging tools and techniques.	3 WKS
3.	Modular programming with functions, subroutines and libraries.	4 WKS
4.	Arrays, string processing, file Input/Output and error handling.	4 WKS
5.	Command Procedures.	3 WKS

IV. LEARNING ACTIVITIES / REQUIRED RESOURCES

The learning activities have been blocked in related topic areas. The sequence in which they will be delivered may not necessarily correspond to these topics. However, we will attempt to cover all of activities by the end of the course.

TOPIC 1    STRUCTURED APPROACH TO PROBLEM SOLVING

LEARNING ACTIVITIES

At the end of this block the students will be able to:

1. Define the problem in his/her own words.
2. Describe what has to be done to solve the problem in English.
3. Define what program design is and why it is important.
4. Describe and use the following structured programming tools and techniques:
  - a) Pseudo Code
  - b) Modular Code
  - c) Peer Walk Through
5. Use the VAX symbolic debugging program to debug FORTRAN programs.
6. Manually debug and desk check code.
7. Develop larger and more complex programs.

REQUIRED RESOURCES

Instructor's Handouts, Guidance, and Material covered in the class and Labs.

VMS USER'S GUIDE Chapter 6

VAX FORTRAN Text Chapters 14 and 15

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TOPIC 2

DEBUGGING TOOLS AND TECHNIQUES

LEARNING ACTIVITIES

Throughout this course and in future courses the student will find debugging techniques an essential tool to programming and problem solving.

At the end of this block the student will be able to:

1. Acknowledge that it is imperative to know what the program is supposed to do before you can start to effectively solve the problem through debugging.
2. Define what the outcome is supposed to be and identify what the input is.
3. Establish test data and test outcomes.
4. Produce desk copies of the required documentation that will help in solving the problems.
5. Isolate what the program does right and what it does wrong.
6. Focus energies on solving one problem at a time.
7. Proficiently desk check the code and walk through the code by manually memory mapping the iterative outcomes.
8. Proficiently work with the VAX SYMBOLIC DEBUGGER.
9. Identify what the common VAX DEBUGGER commands are and what they do.

REQUIRED RESOURCES

Instructor's Handouts, Guidance, and Material covered in the class and Labs.

ONLINE VAX HELP FACILITY RELATED TO DEBUGGING

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TOPIC 3    MODULAR FORTRAN PROGRAMMING

LEARNING ACTIVITIES

Throughout this course the student will continue to strengthen their programming skills and problem solving.

At the end of this block the student will be able to:

1. Describe what FUNCTIONS are and use them.
2. Describe what SUBROUTINES are and use them.
3. Describe what Libraries are and use them.
4. Appreciate how subroutines and Functions are essential to proper structured programming.
5. Write programs using functions, subroutines and libraries.

REQUIRED RESOURCES

Instructor's Handouts, Guidance, and Material covered in the class and Labs.

VAX FORTRAN Text Chapters 9 to 10

TOPIC 4            ARRAY, STRING, and INPUT/OUTPUT Processing

LEARNING ACTIVITIES

Array and string processing become important tools when dealing with more advanced problems.

At the end of this block the student will be able to:

1. Describe what ARRAYS are and use them.
2. Describe the difference between one dimensional and multi-dimensional arrays.
3. Write programs utilizing one and two dimensional arrays.
4. Define what STRING processing is.
5. Write programs utilizing String Manipulation.
6. Write programs that will process sequential files.

REQUIRED RESOURCES

Instructor's Handouts, Guidance, and Material covered in the class and Labs.

VAX FORTRAN Text Chapters 8, 11, 12 and 14

TOPIC 5    COMMAND PROCEDURES

LEARNING ACTIVITIES

Throughout this course the student will continue to strengthen their skills in using the VAX.

At the end of this block the student will be able to:

1. Discuss the concept of a command procedure, and relate it to the use of a LOGIN.COM file.
2. Use the logical names SYS\$INPUT, SYS\$OUTPUT, SYS\$ERROR, and SYS\$COMMAND.
3. Describe the form and use of the DCL commands such as the following:
  - a) INQUIRE            b) IF            c) EXIT
  - d) GOTO                e) WRITE
4. Describe the ways of defining symbols in DCL, and the method of displaying symbols and logical names.
5. Define keys using the DEFINE/KEY command.
6. Assign logical names with the ASSIGN or DEFINE commands.
7. Use the SET PROTECTION command to protect files and directories.
8. Write a login command procedure that creates a personal working environment, including a menu driven procedure that allows them to select the working environment.

REQUIRED RESOURCES

Instructor's Handouts, Guidance, and Material covered in the class and Labs.

VAX VMS USERS GUIDE Chapters 6 to 7 Appendix A.

V. METHOD OF EVALUATION

Theory Tests, Practical Tests and Quizzes	70 %
Assignments	25 %
Attendance	05 %

The tentative breakdown is as follows:

3	FORMAL THEORY TESTS	at 15 % each.
1	PRACTICAL TEST	at 10 % each.
3	QUIZZES	at 5 % each.
3	ASSIGNMENTS	at 5 % each.
1	GROUP ASSIGNMENT	at 10 %.

Some minor modifications to the above percentages may be necessary. The instructor reserves the right to adjust the mark up or down 5 % based on attendance, participation and whether there is an improving trend.

- \* All Assignments must be completed satisfactorily to complete this course. Late hand in penalties will be 5 % per day. Assignments will not be accepted past one week late unless there are extenuating and legitimate circumstances.
- \* The instructor reserves the right to adjust the number of tests, practical tests and quizzes based on unforeseen circumstances. The students will be given sufficient notice to any changes and the reasons thereof.
- \* Attendance:

Absenteeism will affect a student's ability to succeed in this course. Attendance is encouraged because many things are discussed and learned that may not be specifically evaluated on tests. Absences due to medical or other unavoidable circumstances should be discussed with the instructor, so that comparable activities can be scheduled. 5% of the final grade will be based on attendance.



STRUCTURED PROGRAM DEVELOPMENTCET129V. METHOD OF EVALUATION (CONTINUED)GRADING SCHEME1. TESTS

Written tests will be conducted as deemed necessary; generally at the end of each block of work. They will be announced about one week in advance. Practical on-line tests will be conducted in which time to complete the assigned problems will be a factor in the evaluation. Quizzes may be conducted without advance warning.

2. ASSIGNMENTS

Assignments not completed by the assigned due-date will be penalized by 5% per day late. All assignments must be completed satisfactorily to complete the course.

3. GRADING SCHEME

A+	90	-	100%	Outstanding achievement
A	80	-	89%	Excellent achievement
B	70	-	79%	Average Achievement
C	55	-	69%	Satisfactory Achievement

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 be authorized by the Chairperson. It reverts to an R if not upgraded in an agreed-upon time, less than 120 days.

4. UPGRADING OF INCOMPLETE

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 grade on re-written tests or assignments will be 56%. Where a student's overall performance has been consistently unsatisfactory, an R grade may be assigned without the option of make-up work.

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 assignments, re-writing of tests, or writing a comprehensive supplemental examination.

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VI. PRIOR LEARNING ASSESSMENT

Students who wish to apply for advanced credit in the course should consult with the Prior Learning Assessment Coordinator.

VII. REQUIRED STUDENT RESOURCES:

TEXTBOOKS:

1. "VAX FORTRAN" by David Weinman (NELSON Canada)
2. "The VMS USER'S GUIDE" by Peters and Holmay  
(DIGITAL Press)
3. Instructor's Notes and Class Notes

VIII. ADDITIONAL RESOURCE MATERIALS

None required for this particular course.

IX. SPECIAL NOTES

1. Students with special needs are encouraged to discuss required accommodations confidentially with the instructor.
2. Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students or take advantage of new or different learning opportunities.
3. The topics will not necessarily be covered in the order shown in this course outline.

X. COURSE ANALYSIS SHEET

The course analysis sheet will be available through the Prior Learning Assessment Coordinator.