

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY  
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: ADVANCED BASIC PROGRAMMING  
Code No.: CET 122-6  
Program: COMPUTER ENGINEERING TECHNOLOGY  
Semester: TWO  
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APPROVED:

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Chairperson Date

ADVANCED BASIC PROGRAMMING

Course Name

CET 122-6

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PHILOSOPHY/GOALS:

SEE ATTACHED PAGE

METHOD OF ASSESSMENT (GRADING METHOD):

SEE ATTACHED PAGE

TEXTBOOK(S):

PHILOSOPHY/GOALS

The objective of this course is to develop the programming skills of the student in the BASIC language from a primarily non-mathematical approach. An in-depth study of the BASIC language on the VAX 11-780 is carried out with emphasis on file-handling techniques, formatting output, string handling, and use of external subroutines and functions. An introduction to graphics on the SUPERPET is also carried out. This course provides a practical source for supplementing the STRUCTURED ANALYSIS course with appropriate problems, and allows the student to develop a deeper understanding of the VAX operating system through the writing of COMMAND PROCEDURES and creating libraries of subroutines. Numerical applications are avoided, since the fourth semester numerical methods course will deal with numerical techniques in detail, and second semester math is still insufficient for many applications.

METHOD OF ASSESSMENT

This course will be assessed through a series of tests on each block, and a number of practical assignments. The instructor may demand that all assignments be submitted for successful completion of the course.

ADVANCED BASIC PROGRAMMING

BLOCK 1 - FILE HANDLING TECHNIQUES

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

1. Discuss the difference between the following types of files on the VAX-11 system:

- a) Terminal Format Files
- b) Sequential Files
- c) Relative Files
- d) Indexed Files

2. Describe the operation of the following commands with respect to the various types of file:

- a) MAP
- b) OPEN
- c) GET
- d) PUT
- e) FIND
- f) CLOSE
- g) UPDATE
- h) DELETE
- i) SCRATCH
- j) FREE
- k) UNLOCK
- l) RESTORE
- m) MOVE
- n) NAME AS

3. Discuss the types of errors generated in file-handling operations, and the techniques used by

programs to cope with them.

4. Write programs in BASIC to  
CREATE, LIST, MODIFY, and use the various file types.

BLOCK 2 Subroutines, Formatting, and Arrays

1. Subroutines.

At the end of this section the student shall  
be able to:

a) Describe the process of creating  
subroutines, linking them with a main program, and  
running them.

b) Describe the means of transferring data  
between the main program and the subroutine.

c) Describe the process of forming libraries of  
subroutines which can be linked to the main program.

d) Write programs utilizing the above  
techniques.

2. Formatting.

At the end of this section the student shall  
be able to use the PRINT USING statement to format  
numerical and string data. The student shall be able  
to:

a) Specify the number of digits and the  
position of the decimal place in numeric output.

b) Specify commas, leading asterisks, dollar  
signs, and a trailing minus sign.

c) Specify exponential format.

d) Specify the number of characters in string  
output, and allow for variable size.

e) Left-justify, right-justify, and centre sting output.

### 3. Arrays.

At the end of this block the student shall be able to write programs using one-dimensional and two-dimensional arrays.

## BLOCK III SUPERPET GRAPHICS and FILES

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

1. Describe the graphics capability of the SUPERPET.
2. Program simple graphics applications on the SUPERPET using PRINT statements and POKING data to the screen.
3. Create, modify, update , and list sequential files on the SUPERPET.
4. Output formatted data to the printer .

## BLOCK IV STRING HANDLING and NUMERIC FUNCTIONS

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

1. Utilize functions to perform operations with strings and substrings.
2. Use the supplied trigonometric functions.
3. Use the VAX debugging facility.

ADVANCED BASIC ASSIGNMENT 1

1. Problems 4 and 5 from MOULTON. Hand in the list file and the data.

2. Write programs to create, list, modify, update, and delete the files assigned to your group in STRUCTURED ANALYSIS.

Ensure that at least one of the files is an indexed file.

This job can be carried out by the group, but each individual is responsible for understanding all of the group's work.

Consultation with other groups should be carried out concerning the contents of files, and the file manipulations required with that file. Program and data file listings should be submitted together with a written description of the programs.

ADVANCED BASIC ASSIGNMENT 3

1. Write a program on the SUPERPET to write your name in large letters on the screen in marquee form. That is the name should trace itself on the screen and then erase itself in the same manner. It should repeat this continuously.
2. Write a program that will create a picture of an object of your choice, and cause it to move across the screen.
3. Write a program to create, list, update, and add to a sequential file on the SUPERPET system.
4. Demonstrate your ability to provide formatted output to the SUPERPET printer.

ADVANCED BASIC ASSIGNMENT 4

1. Write a program that will input a string variable and replace all the spaces in the variable with asterisks.
2. Write a program that will input 10 lines of text into a string array using the LINPUT statement. The program should then input a search string and a replacement string. Then the program should replace each occurrence of the search string with the replacement string.
3. Demonstrate your ability to use the VAX debugging facility.
4. Write a program to print a table of sin, cos, and tan of an angle as the angle varies from 0 to 360 degrees in 5 degree steps.

### ADVANCED BASIC TEST

1. Briefly compare the three types of files (sequential, relative and indexed) and indicate what you think might be the advantages and disadvantages of each.
2. Write a program that could be used to create a sequential file containing the names, addresses, and phone numbers of the members of the class, and that reads the file and lists the data on the terminal to verify it's contents.
3. Assume that a relative file named EMPLOYEE has been created containing the names, addresses, and rates of pay(\$'s per hour) for each employee with the record number being the employee number. Also assume that a sequential file named HOURS has been created containing a list of employee numbers and hours worked. Assume that no employee number occurs more than once in HOURS. Write a program that will prepare a list of employee's names, addresses, hours, and pay. Assume that the employee receives time and a half for hours over 40.
4. Assume that an indexed file named STUDENT has been created containing the names and marks in three tests for a class of students. Write a program that allows the operator to carry out the following tasks:
  - a) Delete the record for a given student.
  - b) Modify the mark for a student in any given course.
  - c) Display the name, marks, and average for a given student.Assume that the primary key for the file is the student's name.

ADVANCED BASIC PROGRAMMING

TEST 2

1. Briefly describe the process of creating and running programs using external subroutines.

2. Describe how to use the PRINT USING statement to do the following:

a) Output a number that will be less than 1,000,000 with 2 decimals and a leading dollar sign, with commas where necessary to make the value clear.

b) Right justify a string variable.

3. Write a program that will input three real numbers and call a subroutine to find the largest of the numbers. When control returns to the main program the value of the largest number should be displayed.

4. Write a program to input 10 values of a one-dimensional array x, and calculate and print the average of the ten values, and the difference between each number and the average.

5. Use Print Using statements for the output in problems 4 and 5, or show the statements as you would have used them with Print Using.

starting address of the screen memory is 32768, and that the screen consists of 25-80 column rows. Use the (SHIFT ?) symbol (POKE 127) to draw the line.

2. Write a program to calculate the first three powers as the variable varies from some initial value to a final value in fixed increments. Input the values from the keyboard and format the output, including appropriate headings.

3. Write a program to store the data from 2(b) in a sequential disk file.