

Mercer County Community College

Division of Business and Technology

IST 109

BASIC PROGRAMMING

COURSE DESCRIPTION

The VisualBASIC.NET language will be used to solve a variety of problems for personal, business and scientific computing including disk file manipulation

Text (s): **Reference Division Booklist**

Prerequisites: **MAT030 proficiency**

Co-requisites: none

Credits: 3

Lecture Hours: 2

Studio/Lab Hours: 2

Food and drink are strictly prohibited in classrooms as per health and safety laws. Students may not bring in chemicals or cleaning fluids without the appropriate MSD sheets.
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Course Coordinator: Winston H. Maddox

Latest Review: Fall 2003

I. GENERAL OBJECTIVES

The course is designed to provide the student with sufficient programming and language elements to flowchart structured problem situations and to write structured programs using VisualBASIC.NET. The problems and classroom activities will cover much of the VisualBASIC.NET language elements up through creation and use of sequential files. Professional programming standards will be established and adhered to both in the classroom and the laboratory.

II. TESTS

There will be given a minimum of three tests. Each test will contain sentences completion, interpretation of a flowchart and/or program, and may require the writing of a structured program or program segment. All tests will be in the Testing Center. The tests will not be timed. Each test will be available for at least four days in the Testing Center. There will be no makeup or retesting.

III. QUIZZES

Students should expect a brief quiz each week based upon the previous lecture and reading assignment.

IV. LABORATORY MINI-PROJECTS

Students will be given 3-15 mini-projects to reinforce and experiment with lecture material for the week. These will be evaluated based only upon the specification of the mini-project.

V. LABORATORY MAJOR-PROJECTS

Students will be given a minimum of seven major programming projects to provide reinforcement of material presented in lecture. All assignments will have deadlines. If you encounter or anticipate a problem meeting the deadline, advise your Professor **immediately and prior to the deadline.**

VI. LABORATORY PROJECT EVALUATION

Student's performance of each laboratory assignment will be evaluated and assigned a point value according to the following:

Flowchart	0 to 2 points Flowchart must be neat and done with a template.
Standards	0 to 2 points Specified Programming Standard must be adhered to. Programs must contain properly identified modules. The minimum modules for any program are: Program Identification, Variable Map, Program Description, Main Routine, and EOJ Routine.
Remarks	0 to 1 point Generous use of remarks within the Main and Subroutines must be made.
Use of Project Lesson	0 to 2 points The statements specified in the "project lesson" section of the assignment must be used.
Execution	0 to 3 points Output must be according to the project's specifications.
Total each project	0 to 10 points

VII. SUMMATIVE EVALUATION

There will be a separate summative evaluation.

VIII. FINAL GRADE

The final grade is a composite based upon:

Tests (Theory/projects/both)	40%
Laboratory Major Projects (class)	30%
Midterm Examination	15%
Final Examination	<u>15%</u>
	100%

COURSE OUTLINE

WEEK ONE:

TOPIC: Introduction

READINGS:

VisualBASIC.NET Students will be able to:

- Define or identify the definitions or functions of the following items:

Computer	Hardware
Software	Program
Data	Computer System
Input Devices	Output Devices
Storage Devices	Processing Device
CPU	RAM
Auxiliary Storage	Secondary Storage
Primary Storage	Information
BIT	ASCII
Byte	Kilobyte
Megabyte	ROM
System Software	Application Software
Pointing Devices	Mouse
Hard Disk	Hard Copy
Soft Copy	Programming Language
Source Language	MS-DOS
Compiler	Flowcharting
Interpreter	Flowchart
Directory	

- State the procedure to properly power-on and power off the microcomputer system.
- State how often we should format a diskette.
- State rules for correct handling and storage diskettes.
- Correctly format and label their diskette.
- Describe the formation contained in a directory listing.
- State the value of laboratory assignments and the value of tests as a percentage of the final grade.
- List the components of a completed laboratory project that are used for grading and their point value.
- Identify four standard filename-extensions.
- Demonstrate the ability to use the full screen editor to enter a given VisualBASIC.NET program, save it, print it, run it and make specified changes to the program.
- List and explain the six steps in the program development cycle.
- Identify or draw the following standard flowchart symbols for programming:

Input/Output	Decision
Connector	Process
Terminal	Predefined Process

Use the following MS-DOS commands:

DIR	DEL
COPY	

WEEK TWO:

TOPIC: Program Design and Development

READINGS:

The student will be able to:

- List five program modules that should always be present in a completed laboratory project.
- List the minimal contents of the Program ID module.
- List two reasons for creating and adhering to Programming Standards.
- State two uses of the REM statement.
- State the exact output produced by various PRINT statements containing literals and numeric constants with print control characters.
- State the exact output produced by various PRINT statements containing literals and numeric constants with print control functions.
- State the exact size of a print zone.
- Define or recognize the definition of a:

Flowchart

Algorithm

TAB Function

REM Statement

PRINT Statement

Program Module

Hierarchy Chart

Selection Control Structure

Pseudocode

Iteration

END Statement

SPC Function

CLS statement

LPRINT statement

Structure Chart

Iteration Control Structure

Sequence Control Structure

Coding

- List the three Fundamental Control Structures in structured programming.
- Design a structure chart for a given problem.
- Draw a flowchart for a given structure chart.
- Design a structure chart and a flowchart for a given problem.

WEEK THREE:

TOPIC: Variables, Data Types, Arithmetic

READINGS:

The student will be able to:

- Given a list of variables names identify each as being Short Integer, Long Integer, Single Precision Real, Double Precision Real, Character String, or an Invalid name.
- State the rules for naming variables and implicitly declaring their type.
- State the purpose of DEFINT, DEFLNG, DEFSNG, DEFDBL, and DEFSTR.
- List five reserved words.
- State the result of assignment statements containing various arithmetic operations.
- Define or recognize the definitions or functions of the following:

Variable	Variable Name
Integer	Real Number
Floating Point	Constant
CONST statement	constant name
Assignment Statement	LET Statement
Prompt	INPUT Statement
Arithmetic Operations	INT Function
MOD Function	SPC Function
SUB Statement	SQR Function
END SUB Statement	RETURN Statement
RIGHT\$ Function	LEFT\$ Function
LEN\$ Function	MID\$ Function

- State the exact output produced by various PRINT statements containing literals and numeric constants, numeric expressions, and/or variables, and different print format control characters.
- State the result of any given assignment statement.
- State the reason for providing a meaningful prompt.
- Contrast implicitly and explicitly defined data types.
- Design and code a structured program employing a sequence control structure.
- Given a structured flowchart code the program.
- Demonstrate two techniques of providing a prompt message to accompany the INPUT statement.
- Read and state the exact result of a short program using various forms of the INPUT statement.
- Flowchart and code a structured program that uses the INPUT statement along with previously covered statements.

WEEK FOUR:

TOPIC: Introducing Top-Down

READINGS:

The student will be able to:

- Given a list of variables names identify each as being Short Integer, Long Integer, Single Precision Real, Double Precision Real, Character String, or an Invalid name.
- State the rules for naming variables and implicitly declaring their type.
- State the purpose of DEFINT, DEFLNG, DEFSNG, DEFDBL, and DEFSTR.
- List five reserved words.
- State the result of assignment statements containing various arithmetic operations.
- Define or recognize the definitions or functions of the following:

Variable	Variable Name
Integer	Real Number
Floating Point	Constant
CONST statement	constant name
Assignment Statement	LET statement
Prompt	INPUT statement
Arithmetic Operations	INT Function
MOD Function	SPC Function
SUB Statement	SQR Function
END SUB Statement	RETURN Statement
RIGHT\$ Function	LEFT\$ Function
LEN\$ Function	MID\$ Function

- State the exact output produced by various PRINT statements containing literals and numeric constants, numeric expressions, and/or variables, and different print format control characters.
- State the result of any given assignment statement.
- State the reason for providing a meaningful prompt.
- Contrast implicitly and explicitly defined data types.
- Design and code a structured program employing a sequence control structure.
- Given a structured flowchart code the program.
- Demonstrate two techniques of providing a prompt message to accompany the INPUT statement.
- Read and state the exact result of a short program using various forms of the INPUT statement.

Flowchart and code a structured program that uses the INPUT statement along with previously covered statements.

WEEK FIVE:

TOPIC: Report Design

READINGS:

The student will be able to:

- Write a correct PRINT USING statement given the desired output format and expected data to be formatted.
- Design a hard copy report, flowchart and code a structured program to produce the report from a sequential file with all data being printed with an edit mask.
- Design a hard copy report including page numbers, then flowchart and code a structured program to produce the report from a sequential file with all data being displayed using an edit mask and maintaining correct page overflow
- Define or recognize the definitions or functions of the following:

Detail report	Summary report
Exception report	Edit report
Periodic report	Demand report
Main heading	Column heading
Print chart	Hard copy reports
Soft copy reports	LPRINT statement
LPRINT USING statement	PRINT USING statement
Formatting characters	Format strings
Format dollar sign	Asterisk fill
Line counter	Page counter
Page overflow	

- State the general format of the PRINT USING statement.
- State the exact output of several different given PRINT USING statements for

Real	Integer
Dollar and cent	Asterisk fill field
Debit and credit	Positive and negative values
Floating dollar	Leading zeros
Sign	Blank if zero
Exponential format	Left justified fixed length strings
Centered strings	Left justify variable length strings
First character only of strings	Edit mask
Left justify	Right justify

WEEKS SIX & SEVEN:

TOPIC: Program Structures

READINGS:

NOTE: The chapter size is deceiving. Because the topic is pivotal and your success in programming approximately two weeks will be devoted to classroom exercises to reinforce this topic.

The student will be able to:

Define or recognize the definitions or functions of the following:

Relational Operator	Logical Operator
Loop	Iteration
Sequence	Nested Loop
DO WHILE Statement	DO UNTIL Statement
LOOP statement	Selection
Endless Sloop	IF/THEN Statement
IF/THEN – ELSE Statement	END IF Statement
BOOLEAN Variable	SELECT CASE
END SELECT	CASE ELSE

- Since the rules for creating a structured iteration.
- Compare the DO WHILE and DO UNTIL statements.
- Read and state the output of a program that uses the DO WHILE loop control statement along with other previously covered statements.
- Flowchart and code a structure program using the DO WHILE loop control statement along with other previously covered statements.
- Read and state the output of a program that uses the DO UNTIL loop control statement along with other previous covered statements.
- Flowchart and code a structured program that uses the DO UNTIL loop control statement along with other previously covered statements.
- Read and state the output of a program that uses the IF _____ THEN-----structured with multiple statements on a true conditions.
- Read and state the output of a program that uses the IF _____ THEN _____ ELSE _____ structure with multiple statements on both true and false conditions along with previously covered statements.
- State the result of a given SELECT CASE statement for a given case values.
- Design a menu, flowchart and code a structured menu program that utilizes the SELECT CASE, CASE, CASE ELSE, AND END SELECT statements.
- State the two structured programming rules governing Iteration Control Structures.
- Correctly draw the flowcharting symbol for loop control.
- State the reason why a “double read” is necessary in structured programs.

WEEKS EIGHT THROUGH TEN:

TOPIC: Introduction to Files and Sequential File Processing

READINGS:

The student will be able to:

- Define or recognize the definitions or functions of the following:

File	Record
Field	Master File
Transaction File	Record Key
Sequential Organization	Random Organization
Indexed Organization	Creation Programs
Update Program	Report Program
Inquiry Program	Heading Line
Detail Lines	Summary Line
File Reference Number	MODE
Input Mode	Output Mode
Append Mode	OPEN Statement
CLOSE Statement	INPUT # Statement
EOF Function	PRINT # Statement
WRITE #	Control Break
Control field	Level One
Level two	

- Write the OPEN statement for a sequential file that is to be created.
- Write the OPEN statement for a sequential that already exists.
- Write the CLOSE statement for a given file.

WEEKS TWELVE THROUGH FOURTEEN:

TOPIC: Table Processing

READINGS:

The student will be able to:

- Define or recognize the definitions or functions of the following;

Array	Array elements
Subscripted variables	Static variables
Dynamic array	Static array
Dynamic data	DATA statement
READ statement	RESTORE statement
FOR statement	NEXT statement
Loop control variable	Step increment value
Stop value	Table
DIM statement	Subscript
One dimensional array	Two dimensional array
Positional organized	Direct addressable array
Array search	Search argument
Array argument	Array organized
Table search	Table argument
OPTION BASE statement	

- State the exact number of elements in a given single dimensioned static array.
- Correctly identify integer, real, and string arrays.
- State the reason why subscripts should be integer values.
- Write a DIM statement for a single dimensioned static array of any specified type and size.
- Design and code a structured program using a single dimensioned static array with subscripts that are variables.
- Design and code a structured program using a single dimensioned static array with subscripts that are expressions.
- State the difference between integer, real and string arrays.
- State the output of a given program containing single dimensioned static arrays with subscripts.
- State the general format of FOR /NEXT loop control statements.
- Read a FOR/NEXT loop and correctly identify the following Loop Control Variable: Initial Value, Test Value and Step Value.
- Read and correctly state the output of a program containing the FOR/NEXT loop control statements along with previously covered statements.
- Design and code a structured program that uses FOR/NEXT loop control statements along with previously covered statements.
- State the exact number of elements in a given static array.
- Write a DIM statement for a static array of any specified type and size.
- Write a program using a two-dimension static array with subscripts that are variables.
- Write a routine using a single-dimension static array that performs the same function as routine using a two-dimension static array.
- State the output of a given program containing two dimension static arrays with subscripts that are expressions or variables.

WEEK FIFTEEN:

TOPIC: Introduction to Data Validation, String Functions, and String Manipulation

READINGS:

The student will be able to:

- Define or recognize the definitions or functions of the following;

Presence test	Class test
Range test	Limit test
Length test	Check digit test
Control totals	Error messages
MID\$ function	LEN function
LEFT\$ function	RIGHT\$ function
VAL function	INSTR function
ASC function	CHR\$ function
LCASE\$ function	UCASE\$ function
SPACE\$ function	STRING\$ function
LTRIM\$ function	RTRIM\$ function
DATE\$ statement	TIME\$ statement
LINE INPUT statement	INKEY\$ function
INPUT\$ function	

- Given two strings write the statement to form a third string by concatenating the first two.
- Correctly state the output when given any of the following string functions:

MID\$	LEN
LEFT\$	RIGHT\$
VAL	INSTR

- Given two strings state which is greater.
- State the possible data validation concerns for each given description of fields to be input from the keyboard.
- Write the missing data validation code for a given incomplete program

End.

Academic Integrity Statement

“A student who a.) knowingly represents work of others as his/her own; b.) uses or obtains unauthorized assistance in the execution of any work; or c.) gives fraudulent assistance to another student is guilty of cheating. Violators will be penalized.” (Student Handbook)

Classroom Conduct Statement

It is the students' responsibility to attend all of their classes. If they miss a class meeting for any reason, students are responsible for all content that is covered, for announcements made in their absence, and for acquiring any materials that may have been distributed in class. It is expected that students be on time for all their classes. If students walk into a class after it had begun, it is expected that they choose a seat close to where they entered the room so they do not disrupt the class meeting.

Students are expected to follow ordinary rules of courtesy during class session. Engaging in private, side conversations during class time is distracting to other students and to the instructor. Leaving class early without having informed the instructor prior to class is not appropriate. Unless there is an emergency, leaving class and returning while class is in session is not acceptable behavior. Disruptive behavior of any type, including sharpening pencils during class while someone is speaking, is not appropriate.

The college welcomes all students into an environment that creates a sense of community and pride and respect; we are all here to work cooperatively and to learn together.