SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

Sault College

COURSE OUTLINE

COURSE TITLE: Visual Basic For GIS

CODE NO. : GIS4010   **SEMESTER:** One

PROGRAM: Geographic Information Systems Specialist

AUTHOR: Dan Kachur

DATE: October 2002   Previous Outline Dated: Oct. 2001

APPROVED:

_____   _____
                     DEAN   **DATE**

TOTAL CREDITS: 3

PREREQUISITE(S):

HOURS/WEEK: 4

I.   COURSE DESCRIPTION:

The course will overview the tools Visual Basic has to offer, and how to incorporate the various components into Visual Basic applications. The course will focus on introductory application building. Once the student becomes familiar with Visual Basic's programming environment, he / she will be ready to create their own programs. The course will guide the students in comfortably creating a Visual Basic front-end to a database application. In addition, the student will work with ESRI's Active X MapObject control to display ArcView .SHP files. The end-result will be the packaging of your Visual Basic projects into complete Windows applications including the creation of a setup.exe.

II.   LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1.   **DESCRIBE AND USE SOME ELEMENTARY COMPONENTS AND FUNCTIONS**

Potential Elements of the Performance:

This learning outcome will constitute approximately 5% of the course.

➢ Describe what Visual Basic 6 is?
➢ Demonstrate and use Visual Basic's Main Components
➢ Explain Key Terms That Should be Known
➢ Design a User Interface
➢ Set Property Values
➢ Write Code and Run the Program
➢ Save, Open, and Modify a Project
➢ Print Form Image, Form Text, and Code

2. **EXPLAIN AND USE VISUAL BASIC'S FEATURES**
   Potential Elements of the Performance:

   This learning outcome will constitute approximately 10% of the course.

   - ➢ Explain Visual Basic Objects
   - ➢ Set Object Properties
   - ➢ Describe and implement Naming Conventions
   - ➢ Use Font, Color, Picture, Visible, and Enabled Properties

3. **ALTER PROPERTIES AT RUN TIME**
   Potential Elements of the Performance:

   This learning outcome will constitute approximately 10% of the course.

   - ➢ Change Property Values with Code
   - ➢ Perform Drag-and-Drop Techniques
   - ➢ Use Special Techniques with Forms

4. **USE ADDITIONAL FEATURES OF VISUAL BASIC 6**
   Potential Elements of the Performance:

   This learning outcome will constitute approximately 15% of the course.

   - ➢ Demonstrate how to Manage Controls
   - ➢ Use the Command Buttons
   - ➢ Create Labels
   - ➢ Create Text Boxes
   - ➢ Create Scroll Bars
   - ➢ Create Input Boxes and Message Boxes
   - ➢ Implement proper naming conventions

5. **DESCRIBE AND USE ACTIVE X CONTROLS**
   Potential Elements of the Performance:

   This learning outcome will constitute approximately 10% of the course.

   - ➢ Explain What Active X controls are?
   - ➢ Learn how to identify Active X controls in a Windows Environment
   - ➢ Create your own Active X control
   - ➢ Use existing Active X controls

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6. **EXPLAIN, DESCRIBE AND USE VARIABLES IN VISUAL BASIC**
    Potential Elements of the Performance:

    This learning outcome will constitute approximately 5% of the course.

    ➢ Explain Variables and Values
    ➢ Explain Operators and Precedence
    ➢ Explain Variables and Data Types
    ➢ Describe the Scope of variables
    ➢ Format Output using the above

7. **USE VARIOUS FUNCTIONS IN DATABASE APPLICATIONS**
    Potential Elements of the Performance:

    This learning outcome will constitute approximately 15% of the course.

    ➢ Describe the nature of Computer Records
    ➢ Describe Record Structures and Keys
    ➢ Use the Data Control to View File Records
    ➢ Use the Data Form Wizard to Create Database Applications
    ➢ Use Data Control Methods
    ➢ Use the Data Manager to Create a New, Database File

8. **DEVELOP EXECUTABLE APPS USING THE APP DEV.**
    Potential Elements of the Performance:

    This learning outcome will constitute approximately 15% of the course.

    ➢ Create the program's exe file
    ➢ Use the App wizard to combine files into a package
    ➢ Compile the package resulting in the creation of setup.exe

9. **IMPLEMENT THE ESRI MAPOBJECTS ACTIVE X CONTROL**
    Potential Elements of the Performance:

    This learning outcome will constitute approximately 15% of the course.

    ➢ Add the MapObject control to your existing and new projects
    ➢ Add .shp files to the MapObject Active X control
    ➢ Control layers by using Command Buttons
    ➢ Implement Pan and Zoom options
    ➢ Add X, Y coordinates to your MapObjects control

III. TOPICS TO BE COVERED:

1)   Understand What Visual Basic is

Potential Elements of the Performance:
- Event-Driven and Object Oriented Programming
- Why study Visual Basic
- Entering and exiting VB

2)   Understand Visual Basic's Main Components

Potential Elements of the Performance:
- The Menu Bar
- The Tool Bar
- The Form Window
- The Tool Box
- The Properties Window
- The Project Window

3)   Get Help

Potential Elements of the Performance:
- Context-sensitive Help
- Online help
- Books online
- Other sources

4)   Set Property Values

Potential Elements of the Performance:
- Changing property values
- Caption, text, and name settings

5)   Write Code and Running the Program

Potential Elements of the Performance:
- Writing code
- Running a program
- Stopping a program

6)   Save, Open, and Modify a Project

Potential Elements of the Performance:
* Saving a project
* Opening an existing project
* Modifying a project

7)   Print a Form Image, Form Text, and Code

Potential Elements of the Performance:
* Choosing options from a print dialog box
* Trouble shooting printing problems

8)   Understand Visual Basic Objects

Potential Elements of the Performance:
* Some common controls
* Adding and removing controls

9)   Set Object Properties

Potential Elements of the Performance:
* The components of the properties window
* Changing property values
* Visual Basic's intrinsic constants
* Visual Basic's object browser

10)   Understand Naming Conventions

Potential Elements of the Performance:
* Why change control names
* How to name form objects

11)   Use Font, Color, Picture, Visible and Enable Properties

Potential Elements of the Performance:
* Font properties
* Color scheme properties
* The picture property
* The visible property
* The enable property
* The importance of object properties

12)   Change Property Values with Code

Potential Elements of the Performance:
- Properties, methods and events
- A generic instruction

13)   Use Check Boxes, Option Buttons, and Frame Controls

Potential Elements of the Performance:
- Check Boxes (checkboxes)
- Option Buttons (optionbuttons)
- Frames

14)   Use Drag and Drop Techniques

Potential Elements of the Performance:
- Drag Over events
- Drag Drop events
- Coding for bad drops

15)   Manipulate Special Techniques with Forms

Potential Elements of the Performance:
- Form run-time properties
- Using Form_load to change property values
- Printing on a form
- Form click and double click
- Using multiple forms
- Printing forms at run time

16)   How to Manage Controls

Potential Elements of the Performance:
- Listing form objects
- Common properties

17)   Use Command Buttons

Potential Elements of the Performance:
- The cancel and default properties
- Access keys

18) Create Labels

Potential Elements of the Performance:
- Some useful label properties
- Experimenting with autosize and wordwrap properties

19) Use Text Boxes (textboxes)

Potential Elements of the Performance:
- Controlling the contents of textboxes
- Validating data in textboxes
- Changing events
- Using textboxes for output

20) Understand Scroll Bars

Potential Elements of the Performance:
- Property values
- A change event
- Using scrollbars as an output indicator

21) Use InputBoxes and MessageBoxes

Potential Elements of the Performance:
- Input Boxes (inputboxes)
- Message Boxes (messageboxes)

22) Understand ActiveX Controls

Potential Elements of the Performance:
- ActiveX and conventional form controls
- Loading ActiveX Controls
- Saving Projects containing ActiveX controls
- Using the MapObjects ActiveX control to display .shp files

23) Use the CommonDialog Control

Potential Elements of the Performance:
- Using the colour dialog box
- Using the font dialog box
- Using the Open and Save Dialog Boxes

24) **Write Code**

Potential Elements of the Performance:
- Environmental options
- Finding and retrieving lost procedures

25) **Use Editing Tools**

Potential Elements of the Performance:
- Basic editing tasks
- Cut, copy, and paste
- Cursor movement
- Search and replace

26) **Document Programs**

Potential Elements of the Performance:
- Form image, form text, and code documentation
- Comment statements
- Creating about windows
- Printing output

27) **Use Variables and Values**

Potential Elements of the Performance:
- Rules for naming variables
- Manipulating variables at run time
- Testing for acceptable numeric data

28) **Understand Operators and Precedence**

Potential Elements of the Performance:
- Arithmetic operators
- Precedence

29) **Use Variables and Data Types**

Potential Elements of the Performance:
- Data types
- Dim statement
- Overflow
- Option explicit

30) Understand Scope of Variables

Potential Elements of the Performance:
- Form level declarations
- Module and global level declarations
- Static variables

31) Use the If-Then Statements

Potential Elements of the Performance:
- Simple If statements
- Multi-line If statements
- If-Then-Else statements
- The Else-If clause
- Nested If clauses
- Using If statements to test for Valid data

32) Use the Select Case Statements

Potential Elements of the Performance:
- Testing for matching codes
- Testing for range of values

33) Loop with Do Loops

Potential Elements of the Performance:
- Simple Do Loops
- Loop While and Loop Until Do Loops
- Do While and Do Until loops
- Looping with While-Wend

34.) Database Applications

Potential Elements of the Performance:

- Computer records
- Record structures and record keys
- Viewing file records
- Creating database applications
- Using data control methods
- Using data manager

IV.   REQUIRED RESOURCES/TEXTS/MATERIALS:

Title: Visual Basic Programming
Author: Jeffrey J. Tsay
Publisher: Prentice Hall
ISBN: 1-13-026199-8

V.   EVALUATION PROCESS/GRADING SYSTEM:

2 Written Tests (20% each)	40%
2 Hands-on Tests (15% each)	30%
Take-home labs and assignments	30%

(The percentages shown above may vary slightly if circumstances warrant.)

The following semester grades will be assigned to students in postsecondary courses:

Grade	Definition	Grade Point Equivalent
A+	90 - 100%	4.00
A	80 - 89%	3.75
B	70 - 79%	3.00
C	60 - 69%	2.00
R (Repeat)	59% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field placement or non-graded subject areas.	
U	Unsatisfactory achievement in field placement or non-graded subject areas.	
X	A temporary grade. This is used in limited situations with extenuating circumstances giving a student additional time to complete the requirements for a course (see *Policies & Procedures Manual – Deferred Grades and Make-up*).	
NR	Grade not reported to Registrar's office. This is used to facilitate transcript preparation when, for extenuating circumstances, it has not been possible for the faculty member to report grades.	

ELIGIBILITY FOR X GRADES / UPGRADING OF INCOMPLETES

When a student's course work is incomplete or final grade is below 60%, there is the possibility of upgrading to a pass when a student meets all of the following criteria:

1.   The student's attendance has been satisfactory.
2.   An overall average of at least 50% has been achieved.
3.   The student has not had a failing grade in all of the theory tests taken.
4.   The student has made reasonable efforts to participate in class and complete assignments.

Note: **The opportunity for an X grade is usually reserved for those with extenuating circumstances.** The nature of the upgrading requirements will be determined by the instructor and may involve one or more of the following: completion of existing labs and assignments, completion of additional assignments, re-testing on individual parts of the course or a comprehensive test on the entire course.

VI.   SPECIAL NOTES:

Special Needs:
If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your instructor and/or the Special Needs office. Visit Room E1204 or call Extension 493, 717, or 491 so that support services can be arranged for you.

Retention of course outlines:
It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Plagiarism:
Students should refer to the definition of "academic dishonesty" in *Student Rights and Responsibilities*. Students who engage in "academic dishonesty" will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course outline amendments:
The Professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

VII.   PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

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VIII.   DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.