

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: Visual Basic For GIS

CODE NO. : GIS401 **SEMESTER:** 1

PROGRAM: **Geographic Information Specialist**

AUTHOR: Willem de Bruyne

DATE: June 2005 **PREVIOUS OUTLINE DATED:** June 2004

APPROVED:

DEAN **DATE**

TOTAL CREDITS: Three

PREREQUISITE(S):

HOURS/WEEK: Four

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I. COURSE DESCRIPTION:

The course will overview the tools Visual Basic has to offer to build Visual Basic applications in any business or scientific application, and how to incorporate the various components into these applications. The course will focus on introductory application building as well as the features of the language are covered, along with the programming environment. The course will use Microsoft's version 6.0 of the language. Students should be aware that the latest version of Visual Basic is now Visual Basic .NET and it was a complete rewrite from the earlier 6.0 version. We will focus on version 6.0 as our integrated development environment for the reason that not all companies have moved to the new version of Visual Basic. There are still thousands upon thousands of 6.0 applications and the GIS sector has not yet turned 100% to the new .NET Framework.

Once the student becomes familiar with the Visual Basic programming environment, the student will be ready to create their own programs. In doing so the course will cover setting property values of objects, writing code, testing programs, saving/opening/modifying existing programs, as well as printing form images, object properties, and program code. As well as the common controls, students will work with ActiveX controls. The course will guide the students comfortably creating a Visual Basic front-end to a database application.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Introduction to Visual Basic Programming

Potential Elements of the Performance:

- ⓐ Describe programs, programming, applications, and application development
- ⓐ List six principles of user interface design
- ⓐ Describe each of the steps in the program development life cycle
- ⓐ Define structured programming
- ⓐ Read and understand a flowchart
- ⓐ Read and understand a HIPO chart
- ⓐ Explain sequence, selection, and repetition control structures

- ⊙ Describe object-oriented programming
- ⊙ Define the terms objects, properties, methods, and events
- ⊙ Read and understand a generalization hierarchy
- ⊙ Read and understand an object structure diagram
- ⊙ Read and understand an event diagram
- ⊙ Define and explain encapsulation, inheritance, and polymorphism
- ⊙ Describe rapid application development (RAD) and prototyping
- ⊙ Describe VBA, VBScript, and the Visual Basic language

2. Building an Application

Potential Elements of the Performance:

- ⊙ Start Visual Basic
- ⊙ Select SDI Development Environment options
- ⊙ Start a new Visual Basic project
- ⊙ Change the size and location of a form
- ⊙ Add controls to a form
- ⊙ Describe the functions of the Label, TextBox, and CommandButton controls
- ⊙ Move and resize controls on a form
- ⊙ Set properties of controls
- ⊙ Set a form's Name property
- ⊙ Write an event procedure
- ⊙ Use the Val function and SetFocus method within code statements
- ⊙ Document code with comment statements
- ⊙ Save a Visual Basic project
- ⊙ Print an application's form and code
- ⊙ Open an existing Visual Basic project
- ⊙ Use Visual Basic Help

3. Working with Intrinsic Controls and ActiveX Controls

Potential Elements of the Performance:

- Ⓞ Describe the differences between intrinsic controls and ActiveX controls
 - Ⓞ Use a ListBox control in an application
 - Ⓞ Use a Shape control in an application
 - Ⓞ Use a CheckBox control in an application
 - Ⓞ Use an OptionButton control in an application
 - Ⓞ Build an OptionButton group
 - Ⓞ Use a Frame control in an application
 - Ⓞ Use the CommonDialog control in an application
 - Ⓞ Copy controls on a form
 - Ⓞ Add ActiveX controls to the Toolbox
 - Ⓞ Set the Locked, MultiLine, FontSize, and ScrollBars properties of TextBox controls
 - Ⓞ Set the AutoSize and BackStyle properties of Label controls
 - Ⓞ Name controls
 - Ⓞ Copy code between procedures in the Code window
 - Ⓞ Use code to concatenate text
 - Ⓞ Use the AddItem and ShowColor methods within code
 - Ⓞ Declare a variable
 - Ⓞ Use variables and constants within code
 - Ⓞ Use arithmetic and comparison operators in code
 - Ⓞ Use the If...Then...Else code structure
 - Ⓞ Incorporate the ENTER key in applications
4. **Multiple Forms, Dialogs, Debugging, and EXE's**

Potential Elements of the Performance:

- Ⓞ Add additional forms to a project
- Ⓞ Specify a Startup form
- Ⓞ Specify a form's Startup location
- Ⓞ Set a form's BorderStyle property
- Ⓞ Specify an icon for an application
- Ⓞ Use an Image control in an application
- Ⓞ Use ScrollBar controls in an application

- ⓐ Use Line controls in an application
- ⓐ Build an About... dialog box
- ⓐ Create application dialog boxes with the MsgBox function
- ⓐ Work with multiple form Code windows
- ⓐ Use the IsNumeric function in code
- ⓐ Use the If...Then...Else block code structure
- ⓐ Use the Show, Unload, and SetFocus methods in code
- ⓐ Write code using financial functions
- ⓐ Write procedures for the Change, Scroll, and Load events
- ⓐ Use line continuations in code
- ⓐ Use Visual Basic's Debug features
- ⓐ Make an application executable

5. Menus, Data Controls, Common Dialogs, and General Procedures

Potential Elements of the Performance:

- ⓐ Describe the general structure of a database
- ⓐ Describe database fields, records, and tables
- ⓐ Build applications that contain menus, submenus, and pop-up menus
- ⓐ Add access keys, shortcuts, separator bars, and check marks to menus
- ⓐ Build applications that use the Data control
- ⓐ Bind data-aware controls to a Data control
- ⓐ Use a Font common dialog in an application
- ⓐ Create control arrays
- ⓐ Write code to select records in a database
- ⓐ Use the For...Next code structure in procedures
- ⓐ Use the With statement in procedures
- ⓐ Write a general procedure
- ⓐ Use the Not operator in code statements
- ⓐ Write code to add and remove menu check marks during run time
- ⓐ Write a procedure for a MouseUp event

6. Drag and Drop Events and more Complex Code Structures

Potential Elements of the Performance:

- ⓐ Declare variables using type-declaration characters
- ⓐ Write a DragOver event procedure
- ⓐ Write a DragDrop event procedure
- ⓐ Write code to call event procedures
- ⓐ Copy code using keyboard commands
- ⓐ Understand Visual Basic data types
- ⓐ Write subroutines containing nested code structures
- ⓐ Use the Select Case structure in code
- ⓐ Use the Do...Loop structure in code
- ⓐ Use the InputBox function in applications
- ⓐ Use the UCase\$ function in applications
- ⓐ Change properties of a group of controls

7. Database Management and Reporting Applications

Potential Elements of the Performance:

- ⓐ Create and modify database files with the Visual Data Manager Add-In
- ⓐ Create forms with the Data Form Designer
- ⓐ Understand and write code containing Data control methods
- ⓐ Use data-bound ComboBox controls in applications
- ⓐ Write code to create a Recordset search routine
- ⓐ Understand and write code for DataControl Reposition, Validate, and Error events
- ⓐ Understand and write code for Form_Activate events
- ⓐ Create reports with the Report Designer add-in Crystal Reports Pro
- ⓐ Add reports to applications with the CrystalReport ActiveX control

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Microsoft Visual Basic 6, Complete Concepts and Techniques, by: Shelly
Cashmand Repede Mick
ISBN: 0-7895-4654-X

V. EVALUATION PROCESS/GRADING SYSTEM:

Quizzes	60%
<u>Assignments</u>	<u>40%</u>
	100%

The following semester grades will be assigned to students:

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

The professor reserves the right to adjust the mark up or down 5% based on attendance, participation, leadership, creativity and whether there is an improving trend.

A minimum of **80% attendance** required in the labs and lectures.

- Students must complete and pass both the test and assignment portion of the course in order to pass the entire course.
- All Assignments must be completed satisfactorily to complete the 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.
- Makeup Tests are at the discretion of the instructor and will be assigned a maximum grade of 60%.
- The professor 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.
- A student who is absent for 3 or more times without any valid reason or effort to resolve the problem will result in action taken.

NOTE: If action is to be taken, it will range from marks being deducted to a maximum of removal from the course.

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: The student's attendance has been satisfactory. An overall average of at least 50% has been achieved. The student has not had a failing grade in all of the theory tests taken. 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.

Labs:

Lab activities represent a very important component of this course in which practical 'hands-on' skills will be developed. Because of this, attendance is mandatory and the satisfactory completion of all lab activities is required. Evaluation of lab work in-class will be done. It is the student's responsibility to discuss absences from regularly scheduled labs with the instructor so that alternate arrangements (where possible) can be made to complete the lab requirements.

Attendance:

Attendance is mandatory. Absenteeism will affect a student's ability to succeed in this course. Absences due to medical or other unavoidable circumstances should be discussed with the instructor, so that remedial activities can be scheduled. Absenteeism for tests can only be allowed for medical reasons and should be authorized ahead of time. Unauthorized absences could result in a zero grade being assigned.

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 professor and/or the Special Needs office. Visit Room E1101 or call Extension 2493 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.

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.

