

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 2008 **PREVIOUS OUTLINE DATED:** June 2007

APPROVED:

Chair **DATE**

TOTAL CREDITS: Three

PREREQUISITE(S):

HOURS/WEEK: Four

Copyright ©2008 The Sault College of Applied Arts & Technology

Reproduction of this document by any means, in whole or in part, without prior written permission of Sault College of Applied Arts & Technology is prohibited.

*For additional information, please contact Brian Punch, Chair
School of Technology, Natural Resources & Business*

(705) 759-2554, Ext.2681

I. COURSE DESCRIPTION:

The course will overview the tools Microsoft Visual Basic has to offer to build applications in Business and Geographic Information Systems, and how to incorporate the various components into these applications. The course will focus on introductory application building using Visual Basic .Net.

Once the student becomes familiar with the Visual Basic programming environment, the student will be ready to create their own programs, including programs for GIS. In doing so, the course will cover objects, properties, events, code development and testing. The course will also guide students to creating a Visual Basic front-end for database applications.

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 Visual Basic .NET
- Describe the Visual Basic programming language
- Describe programs, programming, applications, and program development
- Identify each of the phases in the development cycle
- Define an algorithm
- Define objects, attributes, and methods
- Explain object-oriented programming (OOP) and design (OOD)
- Describe rapid application development (RAD)
- Identify the key components of .NET

2. THE VISUAL BASIC .NET INTEGRATED DEVELOPMENT ENVIRONMENT

Potential Elements of the Performance:

- Start Visual Basic .NET
- Customize the Visual Basic .NET integrated development environment
- Open a Visual Basic .NET project
- Describe the basic components of the Visual Basic .NET integrated development environment
- Run a Visual Basic .NET project
- Set a property on a control
- Navigate the code window
- Modify code in an existing project
- Save a Visual Basic .NET project
- Print a Visual Basic .NET project's forms and code
- Use Visual Basic .NET Help
- Quit Visual Basic .NET

3. BUILDING AN APPLICATION IN THE VISUAL BASIC .NET ENVIRONMENT

Potential Elements of the Performance:

- Design a Visual Basic .NET application
- Start a new Visual Basic .NET project
- Change the size of a form
- Change property values of a form
- Add controls to a form
- Move and resize controls on a form
- Use the Label, TextBox, NumericUpDown, and Button controls
- Change the property values of controls
- Change the Name property to rename a control
- Write the code for a Click event procedure

- Display line numbers in the code window
- Use control properties in a method
- Document code with a comment header and comment statements

4. WORKING WITH VARIABLES, CONSTANTS, DATA TYPES, AND EXPRESSIONS

Potential Elements of the Performance:

- Use the RadioButton and GroupBox controls
- Use the Layout toolbar to size and align controls
- Set a default button on a form
- Lock controls on a form
- Declare variables and constants
- Use variables and constants within code
- Describe Visual Basic .NET data types
- Convert between data types
- Code a form Load event procedure
- Use the Option Strict statement
- Use arithmetic expressions
- Describe the order of operator precedence in code
- Use the Pmt function
- Use the Format\$ function

5. DECISION MAKING

Potential Elements of the Performance:

- Use the ComboBox control
- Use the If...Then...Else structure
- Use a nested If...Then...Else structure
- Use the Select Case selection structure
- Validate user input
- Use the MessageBox class
- Use string concatenation in code
- Use relational operators in code
- Use logical operators in code

6. LOOPING AND MULTIPLE FORMS PROCEDURES, FUNCTIONS, AND ARRAYS

Potential Elements of the Performance:

Potential Elements of the Performance:

- Add additional forms to a project in an application using the MainMenu
- Change the default icon on the title bar of a form
- Use a ListView control to display data using the ContextMenu
- Use CheckBox controls in an application
- Use the StatusBar property of a form
- Use the ProgressBar control in an application
- Use a Do Until dialog boxes in an application to interact with the user
- Use a Do While loop
- Use one-dimensional and multidimensional arrays in code
- Write a function or procedure to return a value
- Write a keyboard event
- Write code to Resize arguments to functions and sub procedures
- Write code with multiple methods for passing arguments to functions and procedures
- Specify a Startup object for a project
 - Create an enhanced message box with the MessageBox.Show() method
 - Use a collection of controls to access properties and methods in code

LOOPING AND MULTIPLE FORMS

7. USING MENUS, COMMON DIALOGS, PROCEDURES, FUNCTIONS, AND ARRAYS

Potential Elements of the Performance:

- Add a menu bar and menus to an application using the MainMenu control
- Add a shortcut menu to an application using the ContextMenu control
- Use the StatusBar control in an application
- Use the PictureBox control in an application
- Use common dialog boxes in an application to interact with the user
- Use one-dimensional and multidimensional arrays in code
- Write a function procedure to return a value
- Write a sub procedure
- Write code to pass arguments to functions and sub procedures
- Describe the two methods for passing arguments to functions and procedures
- Create an enhanced message box with the MessageBox.Show() method
- Use a collection of controls to access properties and methods in code

III. TOPICS

1. Introduction to Visual Basic Programming
2. THE VISUAL BASIC .NET INTEGRATED DEVELOPMENT ENVIRONMENT
3. BUILDING AN APPLICATION IN THE VISUAL BASIC .NET ENVIRONMENT
4. WORKING WITH VARIABLES, CONSTANTS, DATA TYPES, AND EXPRESSIONS
5. DECISION MAKING
6. LOOPING AND MULTIPLE FORMS
7. USING MENUS, COMMON DIALOGS, PROCEDURES, FUNCTIONS, AND ARRAYS

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Microsoft Visual Basic .NET, Complete Concepts and Techniques, by: Shelly Cashman Quasney

ISBN: 0-7895-6548-X

V. EVALUATION PROCESS/GRADING SYSTEM:

Tests / Quizzes	55%
Assignments	40%
Participation	5%
	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%	
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00
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 a zero grade unless prior permission is granted by the instructor. 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.
- It is expected that a student who is planning on being absent from class to please notify the Professor before-hand.

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 2703 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.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. 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.

Tuition Default:

Students who have defaulted on the payment of tuition (tuition has not been paid in full, payments were not deferred or payment plan not honoured) as of the first week of *March*, will be removed from placement and clinical activities. This may result in loss of mandatory hours or incomplete course work. Sault College will not be responsible for incomplete hours or outcomes that are not achieved or any other academic requirement not met as of the result of tuition default. Students are encouraged to communicate with Financial Services with regard to the status of their tuition prior to this deadline to ensure that their financial status does not interfere with academic progress.

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. ADVANCE CREDIT TRANSFER:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question.