

# Visual Basic Programming for Natural Resource Scientists

## FIW 5984 (2 credits)

**Meeting Time:** Tuesdays 9:00 – 11:00 a.m.  
**Location:** Cheatham Hall, Room 217 (CEARS lab)

**Instructor:** Michelle Davis                      231-1424  
349 Latham Hall                                      midavis1@vt.edu

**Office Hours:** Mondays 2:00 – 4:00, Wednesdays 9:00 – 11:00, or by appointment

---

**Overview:** Programming is more than just understanding the syntax of a computer language. It requires defining the problem specifically, formulating a logical solution to the problem, and implementing the solution in small, logical steps. These skills are best learned by doing hands-on programming of real-world problems and scenarios. Although most of you probably won't be writing computer programs every day, I want you to be able recognize scenarios where programs might be useful, and then be able to go back through your course material and other resources to write a working program.

### Overall Course Goals:

- Investigate the fundamental logic of computer programming
- Design, construct, and evaluate programs in Visual Basic
- Imagine situations in which programs could be developed as problem-solving tools

### Course Objectives: After completing this course, students will be able to...

- Plan a computer program to address a problem using flowcharts and diagrams
- Create an effective, user-friendly program interface
- Formulate a logical solution using Visual Basic
- Demonstrate standard programming conventions and good programming techniques
- Integrate different types of input and output effectively into a program
- Verify program results and assess benefits of alternative approaches
- Explain how a program works to someone unfamiliar with the program
- Begin using Visual Basic in conjunction with Excel, Word, Access, and ArcGIS
- Identify and invent potential applications for programs and models in natural resources

**Text:** Foxall, J. 2006. Teach yourself Visual Basic 2005 in 24 hours. Sams Publishing, Indianapolis. ISBN 0672327392.

**Course Format:** This course will consist of classes that combine lecture and hands-on programming. Each class will begin with a lecture to introduce new skills that build on skills from previous lectures. In class, we will work through basic examples of each technique, using scenarios from natural resources fields. The remainder of class time will be used as a lab to work on class exercises and to begin the homework assignment. Group discussion of difficulties with concepts or specific examples is highly encouraged, during both lecture and lab time. All course materials, including sample homework solutions, will be posted on Blackboard.

**Assignments and Group Project:** The best (and maybe the only) way to learn how to write computer programs is by solving problems and programming solutions. To give you practice, there will be 10 homework assignments during the class. Each assignment is due by the beginning of class on the day listed in the course schedule. Late work will be accepted for 1 week, but will be penalized 10% for each day that it is late. Each student will be required to present a homework solution to the class once during the semester, making them eligible for up to a 5% bonus on that assignment.

Additionally, you will work with 2 to 3 other students to develop a program for an external group (a service-learning project). I have some in mind already, but please let me know if you have any ideas. A previous class developed programs for Bat Conservation International, Conservation Management Institute, and Virginia Dept. of Game and Inland Fisheries.

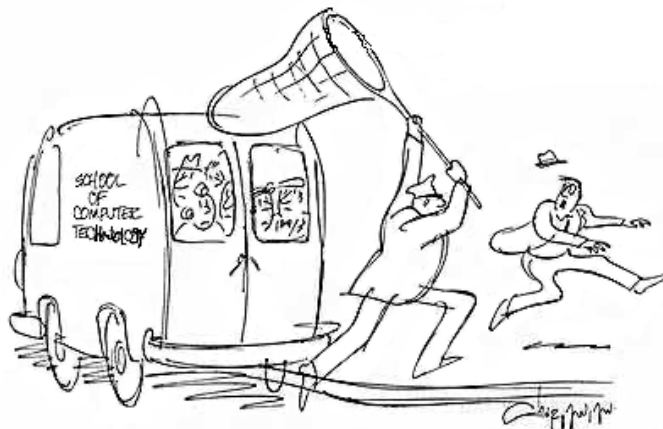
I will give you a detailed description of what is expected of you for each assignment and the group project. Since a goal of this class is to get you thinking about situations where computer programs might be useful, you have the option to tailor any homework assignment to your own research, pending my approval of your idea. If you choose this option, you will also be responsible for writing a description of your problem and approach, similar in format to the original assignment.

### Grading:

10 Homework assignments = 80% of final grade (8% each)

Group project = 20% of final grade

A: 90-100%    B: 80-89%    C: 70-79%    D: 60-69%    F: <60%



"But I don't want to be a computer programmer!"

**Honor Code:** The Honor Code will be strictly enforced in this course. All assignments submitted shall be considered graded work, unless otherwise noted. All aspects of your coursework are covered by the Honor System. Any suspected violations of the Honor Code will be promptly reported to the Honor System. According to the Constitution of the Virginia Tech Honor System "The fundamental beliefs underlying and reflected in the Honor Code are: (1) that trust in a person is a positive force in making that person worthy of trust, (2) that every student has the right to live in an academic environment that is free from the injustices caused by any form of intellectual dishonesty, and (3) that the honesty and integrity of all members of the university community contribute to its quest for Truth." (see <http://www.honorsystem.vt.edu/>)

**Special Needs:** Reasonable accommodations are available for students who have a disability. Students should contact the Services for Students with Disabilities (SSD), 150 Henderson Hall, 231-3788 (V), 231-1740 (TTY); Susan P. Angle, [spangle@vt.edu](mailto:spangle@vt.edu), [www.ssd.vt.edu](http://www.ssd.vt.edu). "Students with disabilities are responsible for self-identification....To be eligible for services, documentation of the disability from a qualified professional must be presented to SSD upon request. Academic adjustments may include, but are not limited to: priority registration, auxiliary aids, program and course adjustment, exam modifications, oral or sign language interpreters, cassette taping of text/materials, note takers/readers, or assistive technology."

**Virginia Tech's Principles of Community:** Virginia Tech is a public land-grant university, committed to teaching and learning, research, and outreach to the Commonwealth of Virginia, the nation, and the world community. Learning from the experiences that shape Virginia Tech as an institution, we acknowledge those aspects of our legacy that reflected bias and exclusion. Therefore, we adopt and practice the following principles as fundamental to our on-going efforts to increase access and inclusion and to create a community that nurtures learning and growth for all of its members:

==> We affirm the inherent dignity and value of every person and strive to maintain a climate for work and learning based on mutual respect and understanding.

==> We affirm the right of each person to express thoughts and opinions freely. We encourage open expression within a climate of civility, sensitivity, and mutual respect.

==> We affirm the value of human diversity because it enriches our lives and the University. We acknowledge and respect our differences while affirming our common humanity.

==> We reject all forms of prejudice and discrimination, including those based on age, color, disability, gender, national origin, political affiliation, race, religion, sexual orientation, and veteran status. We take individual and collective responsibility for helping to eliminate bias and discrimination and for increasing our own understanding of these issues through education, training, and interaction with others.

==> We pledge our collective commitment to these principles in the spirit of the Virginia Tech motto of Ut Prosim (That I May Serve).

**Course Schedule:**  
(subject to change)

Week	HW due	Reading	Topics to be Covered
1	-----		Visual Basic .NET programming environment Creating a user interface Introduction to using controls
2	-----		Working with controls, objects, message boxes Event-driven programming
3	HW # 1		Declarations and variable types Operators and mathematical functions Debugging your program
4	HW # 2		Conditional statements and decision structures
5	HW # 3		Loops
6	HW # 4		Reading and writing data files Working with strings
7	HW # 5		Arrays
8	HW # 6		Graphing
9	HW # 7		Random number generation
10	-----		Using multiple forms Group project descriptions
11	HW # 8		Working with Excel and Word
12	-----		Working with Access and databases Deploying your programs
13	HW # 9		Modules and procedures VBA macros in Excel and ArcGIS
14	-----		Topic to be determined by the class
15	HW # 10		Topic to be determined by the class
16	-----		Present near-final version of group projects**

\*\*Final version of group projects due no later than final exam day.