

Geography 676 Programming for GIS

Course overview and objectives

This course is an introduction to programming for geography graduate students. The foundational concepts of computer programming will be introduced within the framework of ArcGIS using the Visual Basic for Applications programming language. By the end of the term students will be able to design and implement programs that are correct, robust, and user-friendly using ArcObjects.

Who should take this course?

The material presented by the course is crucial for anyone who works with geographic information systems and wants to customize a GIS environment for particular applications. This course is required for the Master of Professional Studies in GIS and the Graduate Certificate in GIS.

Course requirements and grading

This class will require a significant commitment in time for programming assignments. The midterm and final exams will be projects that demonstrate your ability to synthesize the material and to produce working programs that incorporate geographic concepts. The course grade will be assigned according to the following scheme:

20% : Midterm program

25% : Final program

50% : Weekly programming assignments

5% : Class participation

Textbooks

Required:

Burke, Robert. *Getting to Know ArcObjects*. ESRI Press, 2003. ISBN: 1-58948018-X.

Recommended:

Schneider, David I. *An Introduction to Programming using Visual Basic 6.0*, Fourth edition-Update edition. Prentice Hall, 2004. ISBN: 0-13-142707-5.

Makeup Policy

This class is going to move fast and it is crucial that you keep up. As a result, all assignments must be turned in on time. No late assignments will be accepted without prior arrangement.

Academic Honesty

The University of Maryland, College Park, has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student, you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit www.shc.umd.edu. *Within our class, you may work together to discuss concepts and solution ideas, but you must then produce a program that is original and individual.*

Online Learning

This is an online course with occasional in-person experiences. We will meet online at the announced time for a live audio/video lecture. The lecture will be archived for anyone who absolutely must miss the class, but I encourage you to login at the appointed time so that you can ask questions.

Our class will meet within Blackboard, the university's online learning system. Go to <http://elms.umd.edu> to access the course. After you login, our course will be listed in the right column under My Courses. Click on the course link to access the course.

Short videos that illustrate how to use the online learning system are available on the course page. Click the Tutorials button on the left sidebar to access the tutorials.

Hardware and Software Requirements for this course

All students must have a UMD glue account to obtain permissions to access the software in the lab and on the Citrix server. If you have never worked in the Open Lab, contact me to get permission.

We will also use ESRI's ArcInfo software, available in the Open Lab and on Citrix. You will also receive a CD with ArcGIS Desktop that is good for one year. This version of ArcGIS will handle some of the projects we will do this term, but probably not all of them. The CD will be distributed at Orientation. Visual Basic for Applications will be our implementation language. It is built-in to ArcInfo.

You may use either a PC or a Macintosh computer to access Blackboard. Whichever you choose, it must be equipped with the following hardware:

- Webcam
- Headphones
- Microphone (usually built-in to a good webcam)

You will also need these plug-ins (be sure you have the latest versions):

- Real Media
- Flash Player
- Quicktime for PCs
- Quicktime with the Flip4Mac plugin (for Macs)
- FTP software: we recommend Secure FTP for PC and Fetch for Mac. Both of these are free

downloads from <http://helpdesk.umd.edu> -- scroll down and choose Software Downloads. If you choose to use a different FTP software, it must be capable of SFTP (secure uploads).

Support for Online Learning

This method of taking classes is undoubtedly new to some of you, so we have a few tools to make life easier for you.

Email –

Both your TA and I are always available by email. Use the email link in the sidebar to send us emails at any time. We will answer within 24 hours and probably much sooner.

Online office hours –

We will both have office hours in a Live Classroom each week. The times will be posted in the Announcements. Use the link in the sidebar to access office hours.

Offline office hours –

Post entries to this discussion board that directly concern the course. Everyone can see this board, so try to post only those items that you think everyone could learn from. We will respond to posts here in the board so that everyone can see the answers. Click on the link in the sidebar to access this board.

On campus office hours –

We will post times when we will be available on campus for face-to-face office hours. The TAs will have lab office hours on periodic Saturday mornings.

Lounge –

We have created a place for you to visit with your classmates. This discussion board uses both text and voice. Share everything from discussions about the course material to what you did last weekend. I will look in from time to time but I probably won't respond to anything posted here.

Study Rooms –

Several study rooms have been set up for you to form study groups with your classmates. We will not be monitoring these rooms. Remember that the Honor Code specifies that you are free to work together to discuss the assignments but that you must then separately produce an original and independent result.

Assignments

Each week you will have one or two problems to design and code. The finished product is due before the lecture of the following week. Instructions for submitting assignments will be provided.

SCHEDULE

Week	Reading	Lecture Topics	Assignment
1	Ch 1, 2, 3	Introduction Toolbars, Forms, Dialogs, Variables	Algorithm/Flow Chart
2	Ch 4	OOP, Assignment statements, Built-in Functions	Program 1: Hello World Program 2: Distance on a Great Circle
3	Ch 5, 6, 7, 8	Decisions, Loops, Subroutines/Functions, Debugging	Program 3: Measurement Converter Program 4: Queuing on the Beltway
4		Arrays Programming with objects	Program 5: Descriptive statistics
5 10/6	Ch 9, 10, 11, 12 Burke video	Interfaces, OMDs, Tools, Adding layers	Program 6: Adding Layers
6 10/13	Ch 13, 14, 15,	Symbology, Charts	Program 7: Creating charts
7 10/20	Ch 17, 18	Queries/Cursors	Program 8: River lengths
8 10/27		Spatial Analysis	Program 9: Slope, hillshade
9 11/3		Analysis Tools	Final Project - Program 10: Suitability analysis DUE NOV. 12 by 6pm – no exceptions
10 11/10		Wrap up / Q&A	