

## GIS 6103 - GIS Programming and Customization

### INSTRUCTOR:

Dr. Hartwig Henry HOCHMAIR

Ft. Lauderdale Research & Education Center, Davie West Bldg.

**PHONE/VOICE MAIL:** (954) 577-6317

**E-MAIL:** hhhochmair@ufl.edu

### TEACHING ASSISTANT:

Levente Juhász

Ft. Lauderdale Research & Education Center, Davie West Bldg.

**PHONE/VOICE MAIL:** (954) 577-6392

**E-MAIL:** levente.juhasz@ufl.edu

### COURSE MEETINGS:

Fridays, 11:45am-2:45pm (per. 5-7) via Adobe Connect (recordings available)

First class: Fri, Aug 26; last class: Fri, Dec 2

### OFFICE HOURS:

The instructor and TA can be best reached via the conversation tool in Canvas. Students are also welcome to call by phone or arrange a video conference meeting in Adobe Connect.

### REQUIRED READINGS:

- Amirian, P. (2013). *Beginning ArcGIS for Desktop Development using .NET*. New York, NY: John Wiley & Sons.

### FURTHER RELATED READINGS (NOT REQUIRED):

- Stellman, A. and Greene, J. (2013). *Head First C#, 3<sup>rd</sup> ed.* Sebastopol, CA: O'Reilly Media.

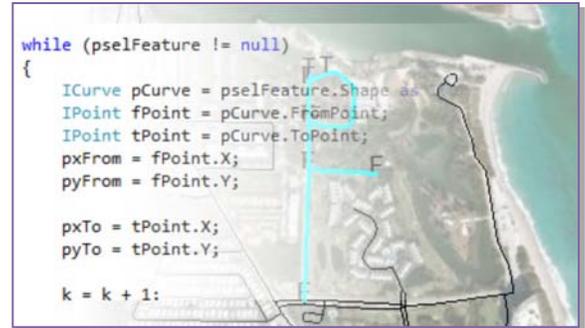
- Albahari, J. and Albahari, B. (2012). *C# 5.0 in a Nutshell: The Definitive Reference (5th ed.)*. Sebastopol, CA: O'Reilly Media.

### ADDITIONAL MATERIALS:

- ArcObjects online Help for .NET developers: Available at

<http://desktop.arcgis.com/en/arcobjects/latest/net/webframe.htm>

**COURSE PREREQUISITES:** While there are no formal course prerequisites, this class assumes that students have a basic knowledge of ESRI's ArcGIS software and that they have also been exposed to some basic programming (e.g. in Python, Basic, R, C, Java-Script).



**COURSE DESCRIPTION:** This hands-on graduate course gives an introduction on how to expand the functional capabilities of a Geographic Information System (GIS) through programming.

**COURSE OBJECTIVE AND STUDENT LEARNING OUTCOMES:**

The course objective is to provide students with a basic understanding of (1) object oriented programming, (2) the syntax of the .NET C# language, (3) ESRI's ArcObjects structure, (4) the Visual Studio programming environment. The programming skills learned will enable students to use scripting for problem solving related to natural resources, planning, forestry, and data visualization.

At the completion of the course, the students will be able to:

- I. read ArcObjects diagrams with object interfaces, properties, and methods
- II. access ArcObjects capabilities through C#
- III. utilize concepts of object oriented programming for spatial programming tasks
- II. conduct vector data analysis using C# and ArcObjects
- V. automate geoprocessing steps

**COURSE SOFTWARE:**

Instructions for obtaining ArcGIS 10.4 software (one-year student license) and Microsoft Visual Studio 2015 are provided on the course Web site.

**GRADING:**

<i>Grade</i>	<i>Percentage</i>	<i>Grade</i>	<i>Percentage</i>
A	92.0-100.0	C+	78.0-79.9
A-	90.0-91.9	C	72.0-77.9
B+	88.0-89.9	C-	70.0-71.9
B	82.0-87.9	D	60.0-69.9
B-	80.0-81.9	E	0-59.9

<i>Grading Item</i>	<i>Grade Percentage</i>	<i>Description</i>
Programming Assignments	97%	- Timeliness and quality of programming assignments;. - Assignments will be performed as a homework every 1-2 weeks.
Assignment presentation	3%	- Present a completed assignment during the lecture to the other students (once during the semester).

**GRADES AND GRADE POINTS:**

For information on current UF policies for assigning grade points, see

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

**LECTURE SCHEDULE:**

<b>Week</b>	<b>Date</b>	<b>Topic</b>	<b>Related readings</b>
1	Aug 26	Introduction to Visual Studio, .NET, C#; Integrated Development Environment	Book Ch. 2
2	Sep 2	C# variable types, basic structures (loops, conditional statements)	Book Ch. 3
3	Sep 9	Classes, objects and arrays	Book Ch. 3, 4
4	Sep 16	Collections, lists and dictionaries	Book Ch. 4
5	Sep 23	ArcObjects object model diagrams	Book Ch. 5
6	Sep 30	Accessing maps and layers	Book Ch. 6
7	Oct 7	Search cursor	Book Ch. 7, 8
8	Oct 14	<i>Homecoming (no class)</i>	
9	Oct 21	Update and insert cursor	Book Ch. 7, 8
10	Oct 28	Feature geometries	Book Ch. 9
11	Nov 4	Graphic elements	Book Ch.11
12	Nov 11	<i>Veterans Day</i>	
13	Nov 18	Geoprocessing tools	Book Ch. 12
14	Nov 25	<i>Thanksgiving (no class)</i>	
15	Dec 2	Creating geodatabase objects	Book Ch. 13

**CLASS FORMAT AND POLICIES**

1. This course is a distance education course taught synchronously the virtual classroom software Adobe Connect. Although the lectures are recorded and available online for review, attendance is strongly encouraged.
2. The Canvas system should be used as the platform for written communication between students and the instructor. Questions and suggestions to the whole class can also be posted under the Discussions tab.
3. For each assignment a due date and time is given, which is usually the beginning of the next class.
4. Lecture material can be downloaded from the course website (<http://elearning.ufl.edu>) at least half an hour before class starts.

**MISSING AND LATE ASSIGNMENT POLICIES:**

1. A 10% penalty per day will be applied to late assignments up to one week after they are due. This means that assignments handed in late on the due date or the next calendar day get a 10% point deduction, assignments handed in 2 days late are taken 20% off, etc. Assignments will not be accepted if handed in more than one week after the due date. If you know in advance that you will be late for an assignment, let the instructor know before the deadline, and it will be decided by the instructor whether an exception can be made on a case-by-case base.
2. Note: Students who cannot attend the class regularly need to arrange with the instructor to satisfy the in-class presentation requirement.

**ABSENCES AND MAKE-UP WORK:**

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

**COMMUNICATION:**

The Canvas system should be used as the primary platform for written communication between students, the instructor, and the TA, where the built-in message or discussion function can be utilized. Any short-term changes concerning lectures or other course components will be announced through Canvas.

**USING ADOBE CONNECT SOFTWARE:**

Live lectures and office hour meetings (per individual student requests) will be conducted with the Adobe Connect web conferencing software. Sessions can be joined by clicking a link posted by the instructor on Canvas.

The following [link](#) explains how to participate in Adobe Connect meetings/sessions. Adobe Connect only requires an internet connection, a web browser, and Adobe Flash Player version 13 or higher. Adobe Connect supports nearly any operating system including Windows, Macintosh, Linux and Solaris, as well as the most widely used browsers including Internet Explorer, Firefox, Safari, and Chrome. A microphone is also needed to communicate with the instructors and the students attending the session.

**ONLINE COURSE EVALUATION PROCESS:**

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>. Should you have any complaints with your experience in this course please visit <http://www.distance.ufl.edu/student-complaint> to submit a complaint.

**ACADEMIC HONESTY POLICY:**

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: "*We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.*" You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: "*On my honor, I have neither given nor received unauthorized aid in doing this assignment.*"

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see:

<http://www.dso.ufl.edu/SCCR/honorcodes/honorcode.php>.

**SOFTWARE USE:**

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

NOTE - This syllabus is tentative and subject to change. As with all classes, you are responsible to know the course schedule, readings & labs, and check for short term changes in the topics, dates, etc.

**UF HONOR CODE:**

As a result of completing the registration form at the University of Florida, every student has signed the following statement: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University."

The instructors of this course fully support the intent of the above statement and will not tolerate academic dishonesty. We, the members of the University of Florida Community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity. Read more: <http://www.dso.ufl.edu/students.php>

**CAMPUS HELPING RESOURCES:**

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Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- University Counseling Center, 301 Peabody Hall, 392-1575, [www.counseling.ufl.edu/cwc/](http://www.counseling.ufl.edu/cwc/)
- Career Resource Center, CR-100 JWRU, 392-1602, [www.crc.ufl.edu/](http://www.crc.ufl.edu/)
- Student Mental Health Services, Rm. 245 SHCC, 392-1171, [www.shcc.ufl.edu/smhs/](http://www.shcc.ufl.edu/smhs/)
  - Alcohol and Substance Abuse Program (ASAP)
  - Center for Sexual Assault / Abuse Recovery & Education (CARE)
  - Eating Disorders Program
  - Employee Assistance Program
  - Suicide Prevention Program

**SERVICES FOR STUDENTS WITH DISABILITIES:**

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation

0001 Reid Hall, 352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)

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