

Cover Sheet: Request 12079

URP4xxx Automation for Geospatial Modeling and Analysis

Info

Process	Course New Ugrad/Pro
Status	Pending at PV - University Curriculum Committee (UCC)
Submitter	Margaret Carr mcarr@ufl.edu
Created	11/20/2017 1:43:48 PM
Updated	12/21/2017 10:50:38 AM
Description of request	Approval of a new course: URP4xxx Automation for Geospatial Modeling and Analysis

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	DCP - Urban and Regional Planning (SLAP) 011506000	Margaret Carr		11/20/2017
urp4xxx_automation for geospatial modeling and analysis syllabus.docx					11/20/2017
College	Recycled	DCP - College of Design, Construction and Planning	Margaret Carr	Please make the changes suggested by the DCP Curriculum Committee and resubmit.	12/6/2017
No document changes					
Department	Approved	DCP - Urban and Regional Planning (SLAP) 011506000	Margaret Carr		12/7/2017
No document changes					
College	Approved	DCP - College of Design, Construction and Planning	Margaret Carr		12/21/2017
No document changes					
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			12/21/2017
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					
College Notified					
No document changes					

Course|New for request 12079

Info

Request: URP4xxx Automation for Geospatial Modeling and Analysis

Description of request: Approval of a new course: URP4xxx Automation for Geospatial Modeling and Analysis

Submitter: Margaret Carr mcarr@ufl.edu

Created: 12/7/2017 12:11:34 PM

Form version: 3

Responses

Recommended PrefixURP

Course Level 4

Number XXX

Category of Instruction Advanced

Lab Code None

Course TitleAutomation for Geospatial Modeling and Analysis

Transcript TitleGeosptl Automtn Anal

Degree TypeBaccalaureate

Delivery Method(s)4136On-Campus

Co-ListingYes

Co-Listing ExplanationMost of the core concepts introduced in this course will be the same as those in the graduate level course, but the graduate course will have some additional and more advanced concepts. In addition, there will be more project assignments for the graduate students and they will be more rigorous. The graduate course number is URP 6271 and is similarly titled.

Effective Term Earliest Available

Effective Year Earliest Available

Rotating Topic?No

Repeatable Credit?No

Amount of Credit3

S/U Only?No

Contact Type Regularly Scheduled

Weekly Contact Hours 3

Course Description This course covers methods and techniques for automating geospatial modeling and analysis for planning and built environment by using visual models, computer programming, and custom-built applications and tools that utilize Geographic Information Systems (GIS) technology in the context of planning information systems.

Prerequisites Basic knowledge of GIS (Geographic Information Systems)

Co-requisites None

Rationale and Placement in Curriculum This course will be required in semester 6 of the Sustainability and the Built Environment Geodesign Specialization

Course Objectives At the conclusion of this course, students should be able to:

- Automate and customize GIS to solve issues related to planning and built environment.
- Develop GIS tools using computer programming and GIS technology.
- Perform typical programming operations such as logical expressions, conditional processing, repetitive actions, and table and feature manipulations.

Course Textbook(s) and/or Other Assigned ReadingZandbergen, P. (2013). Python scripting for ArcGIS. Redlands, California 92373-8100: ESRI Press.

Weekly Schedule of Topics Week 1 Introduction to Model Building

Week 2 Introduction to Programming (Python)

Week 3 Lists and Loops

Week 4 Functions and Error Handling

Week 5 GIS Programming (ArcPy)

Week 6 Selection and Cursors

Week 7 Building Custom Tools

Week 8 Handling Rasters

Week 9 Project Work – Part 1: Develop Model

Week 10 No class / Spring Break

Week 11 Project Work - Part 2: Programming

Week 12 Project Work - Part 2: Programming

Week 13 Project Work - Part 2: Programming

Week 14 Project Work - Part 3: Develop Tool

Week 15 Project Presentation

Week 16 Final materials due

Links and Policies<http://gradcatalog.ufl.edu/content.php?catoid=8&navoid=1493#attendance>

<http://www.dso.ufl.edu/stg/>

Grading Scheme Assignment# Weight

1 7%

2 13%

3 18%

4 22%

Final Project 40%

Total 100%

Instructor(s) Ilir Bejleri, Ph.D

Brief Course Description:

This course covers methods and techniques for automating geospatial modeling and analysis for planning and built environment by using visual models, computer programming, and custom-built applications and tools that utilize Geographic Information Systems (GIS) technology in the context of planning information systems.

Course Objective & Program:

The objective of the course is to give students a basic understanding of the concepts and techniques for solving planning problems more efficiently through automation and customization of Planning Information Systems. The course will focus on planning applications and tools using computer programming and Geographic Information Systems technology. Students will be exposed to fundamental concepts of programming including typical programming operations such as logical expressions, conditional processing, repetitive actions, and table and feature manipulations.

The integration of programming with the use of GIS software for problem solving will be emphasized throughout the course. Students will learn how to automate common manual GIS operations and develop custom GIS tools. User-program interaction will include basic elements of event programming.

Students will practice the acquired knowledge through computer programming assignments that include homework and a final project which focuses on the development of a complete application program.

As the conclusion of this course, students should be able to:

- Automate and customize GIS to solve issues related to planning and built environment.
- Develop GIS tools using computer programming and GIS technology.
- Perform typical programming operations such as logical expressions, conditional processing, repetitive actions, and table and feature manipulations.

Topical Outline

- Overview of information technology for planning and the need for automation
- GIS modeling using graphical modeling techniques
- GIS modeling using programming - Introduction to GIS programming
- Insertion of GIS problem logic into the computer program
- Representing GIS information
- Controlling program flow
- GIS problem solving with efficient code
- Working with layers, tables, rasters
- Automation of attribute and spatial queries
- Bringing it all together: tool design and development

Prerequisite knowledge and Skills

The course requires prior basic knowledge of GIS which students will need to have previously acquired by taking the introductory GIS courses offered by the URP or other departments at University of Florida or elsewhere. Previous programming experience is preferred but not required. At present, the course will teach Model Builder and Python to develop custom GIS applications and tools using ArcGIS. Basic working knowledge of ArcGIS is required.

Delivery Method / Course Format

The course is taught in the classroom in the University of Florida campus. All the course materials are provided on the e-Learning course website.

Requirement for E-learning

Students are required to include a picture of themselves. To do so, go to your E-learning account, add the picture to your profile.

Course Information:

Instructor:	Ilir Bejlari, Ph.D, Associate Professor; ilir@ufl.edu , 352-294-1489; ARCH #454 Office hours: tbd
Assistant:	tbd
Credits:	Three credits
Website:	On e-Learning system
On-campus class	Fridays, periods 2-4, 8:30am to 11:30am, room Arch 439
Field visits:	Not applicable

Required Materials:

Student enrolled in this course are required to obtain the following textbook, computer and software:

- **Text – Zandbergen, P. (2013). *Python scripting for ArcGIS*. Redlands, California 92373-8100: ESRI Press.** The text is a guide for experienced users of ArcGIS Desktop to get started with Python scripting without needed previous programming experience. Experience with other scripting or programming languages is helpful but not required.
- **Computer** – Student must have access to a 64-bit computer that can run the ESRI's ArcGIS software. Students are required to bring the computer in the classroom to perform classroom practice exercises, follow tutorials and work on the final project.
- **Software** – The following software packages are required. Please see **Software Setup** for detailed instructions about obtaining and installing the software.
 - [ArcGIS Pro](#)
 - [PyCharm Community](#)
 - [Microsoft Office](#)

Attendance Policy:

Class attendance is mandatory and should be respected. If students must miss class for any reason, it is imperative that they make arrangements with the instructor to be excused prior to the class period. Two or more unexcused absences will result in a reduction of one grade point off the final grade. While in class, participation is required. Participation includes playing an active role during lectures and class discussions, and displaying equal engagement with team members during collaborative assignments.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:

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

Expectations, Evaluation, & Grading:

The course objectives will be achieved through lectures, assignments, and a final class project. Evaluation and grading for the course have been broken into five parts, each having a weight in the final grade:

Assignments – 60%: Assignments are designed to build student's knowledge and understanding of various aspect of automation and its application to problem solving. Masterful understanding of the concepts throughout the course of the semester will contribute to the student's success in this course. There will be four assignments, each given a calculated weight corresponding to the magnitude and difficulty of work required. Assignments will be graded as follows:

Assignment#	Weight
1	7%
2	13%
3	18%
4	22%
Total	60%

Final Project – 40%: Final project will focus on developing a complete GIS model and tool that addresses an analytical problem. The project covers most of the class knowledge and skills and will be accomplished during several weeks.

Late Submissions: For assignments submitted late there will be a 10 points deduction for each day late for the first three days following the due date. The assignment will not be accepted if it's four days late and a grade of 0(zero) will be issued. Exceptions could be made for extraordinary circumstances consistent with university policies (See link under Attendance Policy above).

University of Florida grading scale

Non-Punitive Grades (not counted in GPA)

W	Withdrew
U	Unsatisfactory
H	Deferred
N	No grade reported

Failing Grades (counted in GPA)

E	Failure
WF	Withdrew failing
NG	No grade reported
I	Incomplete

Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E	WF	I	NG	S-U
% Range	≥93	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	<60				
Grade Point	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	.67	0	0	0	0	0

Student Assistance and Communication:

Other than in the classroom or during office hours, the rest of the communication with the course faculty and assistant will take place within e-Learning. Any emails received outside the e-Learning system will not receive a response.

Help with homework and project assignments will be provided in classroom, during office hours as well as via email or through online communication as applicable.

Academic Honesty:

Student Honor Code and Academic Honesty: Students must follow the University's policy regarding cheating and the use of copyrighted materials. Please consult the undergraduate catalog or visit <https://sccr.dso.ufl.edu/students/student-conduct-code/> for more information.

Disabilities:

Accommodation for students with disabilities: 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.

Spray Painting Policy (College of Design, Construction and Planning):

Spray painting, or the use of any other sort of aerosol spray, is not allowed in the Architecture Building, Rinker Hall and in Fine Arts C, except within the spray booth found in Room 211 of Fine Arts C. Students found in violation of this policy will be referred to the Dean of Students for disciplinary action.

References & Resources:

Web Resources

- <https://sites.google.com/site/stanfordgis2013/introduction-to-python-for-arcgis>
- <https://docs.python.org/2/tutorial/index.html>
- <https://arcpy.wordpress.com/>
- <http://learnpythonthehardway.org/book/>

UF Libraries and Labs

- Library homepage: <http://www.uflib.ufl.edu>
- Architecture & Fine Arts Library: <http://www.uflib.ufl.edu/afa/>
- Course Reserves: <https://ares.uflib.ufl.edu>
- Library Tools and Mobile Apps (smart phones, RSS feeds, etc.): <http://www.uflib.ufl.edu/tools>
- Architecture CIRCA computer lab: <https://labs.at.ufl.edu/architecture.php>

Typical Course Schedule:

MODULE	WEEK	TOPIC	ASSIGNMENTS	
			Assigned	Due
Module 1	Week 1	Introduction to Model Building	Homework 1	
Module 2	Week 2	Introduction to Programming (Python)	Homework 2	
Module 3	Week 3	Lists and Loops		Homework 1
Module 4	Week 4	Functions and Error Handling	Homework 3	Homework 2
Module 5	Week 5	GIS Programming (ArcPy)		
Module 6	Week 6	Selection and Cursors		Homework 3
Module 7	Week 7	Building Custom Tools	Homework 4	
Module 8	Week 8	Handling Rasters		
Project	Week 9	Project Work – Part 1: Develop Model	Project: Part1	Homework 4
	Week 10	No class / Spring Break		
Project	Week 11	Project Work - Part 2: Programming	Project: Part2	Project: Part1
Project	Week 12	Project Work - Part 2: Programming		
Project	Week 13	Project Work - Part 2: Programming		
Project	Week 14	Project Work - Part 3: Develop Tool	Prepare Presentation	Project: Part2
Project	Week 15	Project Presentation		Project Presentation
Project	Week 16	Final Materials Due		

Software Setup

The following software packages are required. Please follow the instructions below to obtain, install and properly setup the software for this class:

- **ArcGIS Pro**
 - You should have received an email from ArcGIS Notifications [<notifications@arcgis.com>](mailto:notifications@arcgis.com) inviting you to join an ArcGIS Online organization, University of Florida. This email was sent to your @ufl.edu email address. If you did not receive this email, please check your spam folder then contact Xingjing Xu (copied here). Xingjing is the TA that will be helping with this course.
 - Follow the instructions in the email to either create a new account or to convert an existing account (note: if you convert an existing account, the contents of that account will be owned by the University of Florida and there is no way to transfer ownership back to you)
 - **Email your ESRI username** to Xingjing.
 - Once we receive your username, a Geoplan Center staff member will provision your account with a license for ArcGIS Pro. Unfortunately, you will not receive any notice once your account has been provisioned. Therefore, wait one day or so before moving to step 5 below.
 - Connect to UF VPN. If you haven't done so before, follow the instructions here <https://connect.ufl.edu/it/wiki/pages/glvpn.aspx>
 - Download and install ArcGIS Pro from <http://transfer.geoplan.ufl.edu/download/agp/>
 - To start, you will be asked to login using the ESRI account above.

- **PyCharm Community**– Download a free copy from:

<https://www.jetbrains.com/pycharm/download/#section=windows>

Important: Set PyCharm Python Interpreter linked to ArcGIS Pro as follows:

After you open PyCharm, go to File->Settings->Project->Project Interpreter. Click on the icon and select Add Local and navigate to "C:\Program Files\ArcGIS\Pro\bin\Python\envs\arcgispro-py3\python.exe". Click Ok. Make sure ArcGIS Pro is licensed and you have signed in when you import arcpy in PyCharm.

- **Microsoft Office** – Obtain a free student copy at:

<http://www.it.ufl.edu/gatorcloud/free-software-downloads-office-365-proplus/>