TITLE: GIS Programming

NUMBER: NRM 638

CREDITS: 3

PREREQUISITES: Basic ArcGIS experience

LOCATION: Distance Delivery from Fairbanks campus

MEETING TIME: Spring Semester 2019

INSTRUCTOR: Dr. David Verbyla

OFFICE LOCATION: ONEILL 368

OFFICE HOURS: most any day by email appointment, we can connect, and screen share remotely via Google Hangouts or I will answer your questions via email

(I try to return emails within 24 hours of receiving them)

TELEPHONE: 907-474-5553

EMAIL ADDRESS: dlverbyla@alaska.edu

COURSE DESCRIPTION

This course is primarily for graduate students and GIS professionals who want to learn Python scripting applications in natural resource management using ArcGIS.

The class will be taught using a sequence of weekly video sessions through the UA blackboard website https://classes.alaska.edu.
After each video session, you will take a blackboard quiz assessing your understanding. After you successfully answer the quiz questions, you will receive access to the next video session. You can take each blackboard quiz as many times as needed to succeed (the blackboard quizzes do not count towards your grade).

COURSE GOALS

1) **To learn basic Python scripting modules outside of ArcGIS.**

2) **To learn arcpy scripting in ArcGIS for geoprocessing analysis.**

3) **To learn how to create script tools in ArcGIS as a graphical user interface.**

4) **To learn how to create Python toolboxes in ArcGIS as a portable alternative to script tools.**

5) **To learn how to create Python add-ins in ArcGIS to perform an action is response to an event.**

STUDENT LEARNING OUTCOMES

After successfully completing this course you will be able to:

1) **Read and write text files**
2) **Write Python functions using the field calculator**
3) **Add messages to ArcGIS geoprocessing results**
4) **Create points, line, and polygon feature classes**
5) **Use Python scripting for decisions and looping**
6) **Process date and time information**
7) **Perform efficient and repetitive geoprocessing operations.**
8) **Perform raster analysis**
9) **Create script tools and Python toolboxes for geoprocessing applications.**
10) **Create ArcGIS Python add-ins for responding to user-triggered events.**

COURSE READINGS/MATERIALS

Online references including Python and ArcGIS help python scripting

TECHNICAL REQUIREMENTS

This course uses ArcGIS 10.4 software which is available for free to all UA students. If you have a windows-based computer, and want to install a student version of ArcGIS, email me (dlverbyla@alaska.edu)

The course also requires internet access for blackboard quizzes (https://www.uaf.edu/bblearn/prod/) and video sessions.

INSTRUCTIONAL METHODS

Each week will be a series of video sessions with each session leading the student in a hands-on Python scripting exercise. The student must successfully answer a blackboard question after each video session in order to access the next video session.

COURSE SCHEDULE

Week1: Python basics

Week2: Using the ArcGIS field calculator with Python scripts

Week 3: Getting GIS point, line, polygon, and table information

Week 4: Creating GIS tables and point,multipoint, polyline, polygon feature classes

Week 5: Updating and querying GIS tables and feature classes

Week 6: Creating random locations and random selections

Week 7: Arcpy Feature Class Geoprocessing

Week 8: Arcpy Raster Geoprocessing

Week 9: Working with Arcmap Map Documents

Week 10: Basic ArcGIS Python Script Tools

Week 11: Advanced ArcGIS Python Script Tools

Week 12: ArcGIS Python Toolbox

Week 13: ArcGIS Python Addins

COURSE POLICIES

Participation

You will use ArcGIS and follow along as I teach you new concepts in each video session. After each video session, I will assess your understanding using a question posted through the class blackboard website. Your understanding will also be assessed using a weekly quiz posted through the class blackboard website.

You should post any sources of confusion and solutions through the class Google+ site to share learning among class participants.

Late Work Policy

Late work will not be accepted, since some weekly sessions assume you have mastered previous weekly sessions.

Academic Integrity

As described by UAF, scholastic dishonesty constitutes a violation of the university rules and regulations and is punishable according to the procedures outlined by UAF. Scholastic dishonesty includes, but is not limited to, cheating on an exam, plagiarism, and collusion. Cheating includes providing answers to or taking answers from another student. Plagiarism includes use of another author's words or arguments without attribution. Collusion includes unauthorized collaboration with another person in preparing written work for fulfillment of any course requirement. Scholastic dishonesty is punishable by removal from the course and a grade of "F." For more information go to Student Code of Conduct. (http://www.uaf.edu/catalog/catalog_08-09/academics/regs3.html#Student_Conduct)

HOW TO SUBMIT ASSIGNMENTS

Weekly quizzes will be available through blackboard (https://classes.uaf.edu)

HOW TO CHECK YOUR GRADE

I will email you your grade for each week's Python scripting assignments.

HOW TO GET HELP

I will be available to help you almost every day…just email me…
I will try to answer any of your email questions within 24 hours.

Whenever you have a problem, email me your script and the specific details of your problem, including any specific error messages.

EVALUATION POLICIES

Course grade will be based on total points earned based on weekly scripting assignments (@10 points each Python script). Late submissions will not be accepted.

Total Points	**Grade:**
>=93%	**A**
85-93%	**B**
75-85%	**C**
65-75%	**D**
<65%	**F**

EFFORT AND STUDENT INVOLVEMENT

Instruction:75% primarily via hands-on learning using weekly video sessions
Assignments:25% weekly scripting assignments

Pacing Expectations

Although actual hours spent each week will vary between individuals, students should expect to spend an average of 9 hours per week on this course.

EXPLANATION OF W, NB, I GRADES

Withdrawals

Successful, Timely Completion of this Course Starting and establishing your progress through this course early can help to encourage your successful completion of the course. Toward this end, this course adheres to the following UAF eLearning & Distance Education procedures:

1. The first contact assignment is due one week after the first day of instruction. *Failure to submit this assignment within the first two weeks of the course could result in withdrawal from the course.*
2. The first content assignment is due one week after the first day of instruction. *Failure to submit this assignment within the first two weeks of the course could result in withdrawal from the course.*
3. *Failure to submit the first three content assignments by the deadline for faculty-initiated withdrawals (the ninth Friday after the first day of classes) could result **in instructor initiated withdrawal from the course (W**).*

No Basis Grades

This course adheres to the UAF eLearning Procedure regarding the granting of NB Grades The NB grade is for use only in situations in which the instructor has No Basis upon which to assign a grade. In general, the NB grade will not be granted.

Incompletes

Your instructor follows the University of Alaska Fairbanks Incomplete Grade Policy.
"The letter "I" (Incomplete) is a temporary grade used to indicate that the student has satisfactorily completed (C or better) the majority of work in a course but for personal reasons beyond the student's control, such as sickness, he has not been able to complete the course during the regular semester. Negligence or indifference are not acceptable reasons for an "I" grade."

SUPPORT SERVICES

UAF eLearning Student Services helps students with registration and course schedules, provides information about lessons and student records, assists with the examination process, and answers general questions. Our Academic Advisor can help students communicate with instructors, locate helpful resources, and maximize their distance learning experience. Contact the UAF eLearning Student Services staff at 907- 479-3444 or toll free 1-800-277-8060 or contact staff directly – for directory listing see: http://distance.uaf.edu/staff/ .

UAF Help Desk
Click here (http://www.alaska.edu/oit/) to see about current network outages and news.
Reach the Help Desk at:
· e-mail at helpdesk@alaska.edu
· fax at (907)-450-8312
phone in the Fairbanks area is 450-8300 and outside of Fairbanks is 1-800-478-8226

DISABILITIES SERVICES

The **UAF Office of Disability Services** operates in conjunction with CDE. Disability Services, a part of UAF's Center for Health and Counseling, provides academic accommodations to enrolled students who are identified as being eligible for these services.

If you believe you are eligible, please visit their web site (http://www.uaf.edu/apache/disability/) or contact a student affairs staff person at your nearest local campus. You can also contact Disability Services on the Fairbanks Campus by phone, 907-474-7043, or by e-mail (fydso@uaf.edu).