Oregon State University
Ecampus

NOTE to prospective students: This syllabus is intended to provide students who are considering taking this course an idea of what they will be learning. A more detailed syllabus will be available on the course Canvas site for enrolled students and may be more current than this sample syllabus.

Course Name: GIS III: PROGRAMMING FOR GEOSPATIAL ANALYSIS
Course Number: GEOG 462/562
Credits: 4

Course Description

Introduction to the extension of geographic information systems (GIS) through programming. No prior programming experience is expected. Teaches a pragmatic approach to design and write programs for geospatial analysis. Equivalent course is GEO 578. PREREQS: GEOG 361 [C-] or GEOG 561 [C-] or GEO 480 [C-]

Course Credits

This course combines approximately 120 hours of instruction, online activities, and assignments for 4 credits.

Technical Assistance

If you experience any errors or problems while in your online course, contact 24-7 Canvas Support through the Help link within Canvas. If you experience computer difficulties, need help downloading a browser or plug-in, or need assistance logging into a course, contact the IS Service Desk for assistance. You can call (541) 737-8787 or visit the IS Service Desk online.

Learning Resources

Textbooks: Python Scripting for ArcGIS - Esri Press

Note to prospective students: Please check with the OSU Bookstore for up-to-date information for the term you enroll (OSU Bookstore Website or 800-595-0357). If you purchase course materials from other sources, be very careful to obtain the correct ISBN.

Canvas

This course is delivered via Canvas, where you will interact with your classmates and your instructor. You will access the learning materials within the course site, such as the syllabus, class discussions, assignments, projects, and quizzes. To preview how an online course works, visit the Ecampus Course Demo. For technical assistance, please visit Ecampus Technical Help.

Measurable Student Learning Outcomes

By the end of this class, undergraduate students will:

Learning Outcomes	Assessment Method
Recognize and use basic spatial and cartographic concepts (e.g. scale, autocorrelation, projection, and coordinate systems).	Discussions, quizzes
Demonstrate ability to use and analyze geospatial data (e.g. satellite images, digital maps and their associated tabular datasets) through Python scripts and code.	Discussions, labs
Develop the capacity to create visualizations (e.g. images and maps) of spatial phenomena, including those illustrating natural and human systems and their interactions, using Python code.	Labs, project
Describe basic principles of programming languages, including variable types, conditionals and control flow, functional programming, and object--based programming	Discussions, quizzes, labs
Use both the console and an integrated development environment to write, run and debug Python scripts	Labs, project
Read and interpret Python scripts written by others, and describe expected behavior in a Python script	Discussions, quizzes, exam, labs
Read, manipulate, and write both vector and raster data using both open-source libraries and ArcPy modules	Labs
Develop custom Python functions to accomplish geospatial analysis	Labs
Carry out an assigned project-scale workflow	Project

Additional learning outcomes for graduate students	
Utilize code and scripts to apply statistical analyses of geospatial data	Labs, project
Use code and scripts to apply critical thinking and problem-solving to geospatial research.	Labs, project
Develop basic Python classes to accomplish geospatial analysis	Labs, project
Utilize outside resources to further advance individual coding abilities and skills.	Project
Design a geospatial coding project, acquire data, carry out analysis and report results in a public symposium	Project

Course components

The course is arranged around weekly lessons, as well as nine weekly assignments and a hands-on final project. Graduate students, you will complete a project of your own design, presented to your colleagues in lieu of a final exam. Additionally, three quizzes (through week 6) and one semi-final exam (in the 9th week) will test your understanding of key concepts.

Evaluation of Student Performance

Grading

	Points
Labs (9 at 50 points)	450
Quizzes (3 at 25 points)	75
Semi-final exam	125
Discussion (10 at 10 points)	100
Project	250
Total	1000

Final grades will be based on standard percentile breakdowns on a non-stretched scale: 90 to 100% of points will earn you an "A", 80-90% of points a "B" etc. (with + and – at three-percent breaks – e.g. 90-91 = A-, 88-89 = B+, etc.).

Letter Grade

Grade	Percent Range
A	92-100
A-	90-91
B+	88-89
B	82-87
B-	80-81
C+	78-79
C	72-77
C-	70-71
D+	68-69
D	62-67
D-	60-61
F	<60

Course Content

Wk	Topic	Reading	Quiz	Test/Assign
1	Course Introduction Python basics	Ch. 1, 3, 4		Discussion 1, Lab 1
2	Fundamentals and Debugging	Ch. 11	Quiz 1	Discussion 2, Lab 2
3	Geoprocessing with ArcPy	Ch. 2, 5		Discussion 3, Lab 3
4	Working with Spatial Data	Ch. 6, 7.6	Quiz 2	Discussion 4, Lab 4
5	Manipulating Spatial Data	Ch. 7, 8		Discussion 5, Lab 5
6	Mapping with ArcPy	Ch. 10	Quiz 3	Discussion 6, Lab 6
7	Custom functions and classes	Ch. 12		Discussion 7, Lab 7
8	Working with Rasters	Ch. 9		Discussion 8, Lab 8
9	Custom script tools	Ch. 13, 14	Exam	Discussion 9, Lab 9
10	Open source geospatial	Guest Lectures		Discussion 10
Finals	Final Project			

Course Policies

Discussion Participation

Students are expected to participate in all graded discussions. While there is great flexibility in online courses, this is not a self-paced course weekly, with your first post due no later than Wednesday evening.

Makeup Quizzes

Makeup quizzes will be given only for missed quizzes excused in advance by the instructor. Excused absences will not be given for airline reservations, routine illness (colds, flu, stomach aches), or other common ailments. Excused absences will generally not be given after the absence has occurred, except under very unusual circumstances.

Late Assignments

Assignments will be given each week, with the exception of the last two weeks (Dead Week and Finals Week). If you fall behind you will struggle with the remaining assignments so no late assignments will be accepted without prior permission from the instructor. Permission will not be given after the due date, and permission will be given only under serious circumstances, for example a documented major illness or injury.

Incompletes

Incomplete (I) grades will be granted only in emergency cases (usually only for a death in the family, major illness or injury, or birth of your child), and if the student has turned in 75% of the points possible (in other words, usually everything but the final project). If you are having any difficulty that might prevent you completing the coursework, please don't wait until the end of the term; let me know right away.

Guidelines for a Productive and Effective Online Classroom

Students are expected to conduct themselves in the course (e.g., on discussion boards, email) in compliance with the university's regulations regarding civility. Civility is an essential ingredient for academic discourse. All communications for this course should be conducted constructively, civilly, and respectfully. Differences in beliefs, opinions, and approaches are to be expected. In all you say and do for this course, be professional. Please bring any communications you believe to be in violation of this class policy to the attention of your instructor.

Active interaction with peers and your instructor is essential to success in this online course, paying particular attention to the following:

- Unless indicated otherwise, please complete the readings and view other instructional materials for each week before participating in the discussion board.
- Read your posts carefully before submitting them.
- Be respectful of others and their opinions, valuing diversity in backgrounds, abilities, and experiences.
- Challenging the ideas held by others is an integral aspect of critical thinking and the academic process. Please word your responses carefully, and recognize that others are expected to challenge your ideas. A positive atmosphere of healthy debate is encouraged.

Statement Regarding Students with Disabilities

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval, please contact DAS immediately at 541-737-4098 or at http://ds.oregonstate.edu. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

Accessibility of Course Materials

All materials used in this course are accessible. If you require accommodations please contact Disability Access Services (DAS).

Additionally, Canvas, the learning management system through which this course is offered, provides a vendor statement certifying how the platform is accessible to students with disabilities.

Expectations for Student Conduct

Student conduct is governed by the university's policies, as explained in the Student Conduct Code. Students are expected to conduct themselves in the course (e.g., on discussion boards, email postings) in compliance with the university's regulations regarding civility.

Academic Integrity

Students are expected to comply with all regulations pertaining to academic honesty. For further information, visit Student Conduct and Community Standards, or contact the office of Student Conduct and Mediation at 541-737-3656.

OAR 576-015-0020 (2) Academic or Scholarly Dishonesty:

a) Academic or Scholarly Dishonesty is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another.
b) It includes:
    i) CHEATING - use or attempted use of unauthorized materials, information or study aids, or an act of deceit by which a Student attempts to misrepresent mastery of academic effort or information. This includes but is not limited to unauthorized copying or collaboration on a test or assignment, using prohibited materials and texts, any misuse of an electronic device, or using any deceptive means to gain academic credit.
    ii) FABRICATION - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.

iii) ASSISTING - helping another commit an act of academic dishonesty. This includes but is not limited to paying or bribing someone to acquire a test or assignment, changing someone's grades or academic records, taking a test/doing an assignment for someone else by any means, including misuse of an electronic device. It is a violation of Oregon state law to create and offer to sell part or all of an educational assignment to another person (ORS 165.114).

iv) TAMPERING - altering or interfering with evaluation instruments or documents.

v) PLAGIARISM - representing the words or ideas of another person or presenting someone else's words, ideas, artistry or data as one's own, or using one's own previously submitted work. Plagiarism includes but is not limited to copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project and then submitting it as one's own.

c) Academic Dishonesty cases are handled initially by the academic units, following the process outlined in the University's Academic Dishonesty Report Form, and will also be referred to SCCS for action under these rules.

Tutoring and Writing Assistance

NetTutor is a leading provider of online tutoring and learner support services fully staffed by experienced, trained and monitored tutors. Students connect to live tutors from any computer that has Internet access. NetTutor provides a virtual whiteboard that allows tutors and students to work on problems in a real time environment. They also have an online writing lab where tutors critique and return essays within 24 to 48 hours. Access NetTutor from within your Canvas class by clicking on the Tools button in your course menu.

The Oregon State Online Writing Lab (OWL) is also available for students enrolled in Ecampus courses.

Student Evaluation of Courses

The online Student Evaluation of Teaching system opens to students the Monday of dead week and closes the Monday following the end of finals. Students receive notification, instructions and the link through their ONID. They may also log into the system via Online Services. Course evaluation results are extremely important and used to help improve courses and the online learning experience for future students. Responses are anonymous (unless a student chooses to "sign" their comments, agreeing to relinquish anonymity) and unavailable to instructors until after grades have been posted. The results of scaled questions and signed comments go to both the instructor and their unit head/supervisor. Anonymous (unsigned) comments go to the instructor only.