Advanced Geographic Information Systems Analysis

GEOG 438 Section 800 (Online) CRN: 33921 Fall 2026

Instructor: Dr. Adam Berland, Ball State School of Earth, Atmosphere, and Sustainability

Course Details: Refer to the course Canvas site for course logistics, instructor contact information, and office hours times

Course Description

Examination and use of analysis techniques in geographic information systems (GIS). Introduction to basic GIS programming. Diagramming, GIS logic and processing flows. Exposure to widely used GIS data models. *Prerequisite*: GEOG 265 or permission of the instructor. 3 credits.

Course Objectives

Students completing this course will:

1) Use lectures and in-class activities to identify core GIS concepts,
2) Associate the appropriate terminology with core GIS concepts on exams,
3) Apply GIS techniques to analyze data in laboratory exercises, and
4) Formulate suitable analytical strategies to address problems using GIS in hands-on activities.

This course will be successful if, at the end of the term, students are able to perform a basic GIS project from start to finish on their own (data collection & preparation, GIS analysis, and presentation of the final product).

Textbook

There is **no textbook** for this course. Instead, students will be asked to complete assigned readings from a variety of sources, as specified by the instructor. Readings will be available on the course Canvas site.

Canvas

The course Canvas site will be a key resource for downloading course materials, monitoring grades, and submitting assignments. Seek assistance immediately if you are having trouble using Canvas.

Course Content and Format

Content. The course content is outlined in the course schedule at the end of this document. As this is the 2nd course in the GIS sequence, students will learn more advanced concepts that build upon the basic skills learned in the introductory course. The first portion of the course will be dedicated to reviewing basic GIS fundamentals and concepts.

Format. Instruction will be delivered through a combination of online lectures and hands-on GIS activities. In addition to viewing lectures, students are expected to complete assigned readings, assignments, and lab projects, and review course material for long-term memory and exam preparation.

Course Engagement

Learning GIS requires engagement with concepts and practice with the technology. Students must remain engaged with the course materials to successfully complete the course. This includes keeping up with lecture material, readings, hands-on activities, and assignments. Students who fall behind due to lack of engagement should not expect the instructor to recap everything that was missed. Students with a good reason for falling behind can expect the instructor to work with them to catch up, but please communicate with the instructor as soon as possible to make arrangements.

Expectations

The instructor expects that students will put forth an honest effort to complete coursework adequately and on time. GIS is often frustrating, and it takes time, determination, and organization to become skilled. For an average grade in a 3-credit course, the average student should expect to work about 6-9 hours per week on assignments, reading, studying, and viewing lectures. You may find yourself putting in more time for GIS – start assignments early!

When you get stuck on a problem, you should first re-read the exercise instructions, then consult help documentation or the internet, and finally the instructor. *Exams must be completed individually, but it is acceptable to search the web or talk with classmates to get help with hands-on assignments and labs, as long as the work you submit for a grade is your own.*

Students can expect the instructor to demonstrate effective GIS techniques, assist with problems, improve understanding of underlying concepts, and provide timely feedback on student work. Under ordinary circumstances I will respond to email within 1 business day.

ArcGIS Pro

This course will require you to use ArcGIS Pro software outside of class time. There are several options for accessing ArcGIS Pro outside of class time:

- Personal computer: Students with a computer that runs Windows can install a copy of ArcGIS Pro for educational uses. See Canvas/Course Information for more details.
- Cooper Science 001: Computer lab in the School of Earth, Atmosphere, and Sustainability, generally open during University business hours Monday-Friday
- BSU Libraries: You can locate these computers using the Software Locator tool (search *ArcGIS Pro*).
    - ArcGIS Pro is available in these libraries: Bracken, Foundational Sciences, Architecture

Academic Dishonesty

Academic misconduct (any form of cheating) is not acceptable. This includes, but is not limited to, cheating on assignments or exams; plagiarizing, which is claiming as one's own work any part of work done by another; submitting the same work, or substantially similar works, to meet the requirements of more than one course without the approval and consent of all instructors concerned; and interfering with another student's work. If you have any questions about what constitutes academic misconduct, please ask your instructor. Violations of the academic integrity policy will be addressed in accordance with the Student Academic Ethics Policy.

Generative AI. Using generative AI tools to complete your assignments will be considered a violation of the Academic Ethics Policy unless the AI use is explicitly approved by the instructor. In general, students may not submit any work generated by an AI program as their own. Doing so is plagiarism and it will be reported as described in the Student Academic Ethics Policy.

Exams

Exams will test your understanding of GIScience concepts using a variety of multiple choice, true/false, matching, map/diagram, short answer, and essay questions. You will *not* be asked to perform digital GIS tasks on exams, because those skills will be assessed in labs.

Grading

Grades will be based on 3 exams (36%), 5 labs (45%), and hands-on activities (19%). Details on labs & hands-on activities will be distributed in class. No extra credit is planned.

Grading scale

A	94-100%	C+	77-79%	F < 60%
A-	90-93%	C	74-76%	Cutoff for credit/no-credit grading: 73%
B+	87-89%	C-	70-73%	
B	84-86%	D+	67-69%	
B-	80-83%	D	60-66%	

Late work/absences: Late lab assignments and hands-on activities will be penalized 20% per day (weekends and holidays included). Exams missed due to unexcused absences cannot be made up.

Grade disputes: Instructors make mistakes grading, or may not see all the possible answers to a question. If you feel that your answer deserves credit, please contest the issue in question via email within 1 week of the item being graded. Explain why you think you deserve credit.

University Statement

We are committed to ensuring that all members of the community are welcome, through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse.

Disability Statement

If you need course adaptations or accommodations because of a disability, please contact the instructor of record as soon as possible. Ball State's Disability Services Office coordinates services for students with disabilities; documentation of a disability needs to be on file in that office before any accommodations can be provided. Disability Services can be contacted at 765-285-5293 or dsd@bsu.edu.

Freedom of Expression

In this course, we are committed to fostering a learning environment that values intellectual diversity, encourages free expression, and promotes open inquiry. As members of the Ball State Community, we treat each person in the Ball State community with civility, courtesy, compassion, and dignity and respect and learn from differences in people, ideas, and opinions. Please review Ball State University's Statement on Freedom of Expression, the resources on Ball State's Freedom of Expression webpage, and Ball State's Beneficence Pledge.

This syllabus is subject to change in the event of extenuating circumstances