Course Syllabus

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Syllabus subject to change.

Course No: 90753
Course Name: Advanced GIS
Day: Tuesdays, Thursdays
Time: 11:00 - 12:20 PM
Location: HBH 2008, In Person Expected (Pittsburgh)

Professor

Chris Goranson (cgoranso@andrew.cmu.edu), Hamburg Hall 2105B.

Office hours will be posted on Canvas, or available by appointment.

Course website

https://canvas.cmu.edu/courses/

Prerequisite

94-802, Geographic Information Systems, Health GIS, equivalent course, or permission of instructor.

Course description

Advanced Geographic Information Systems will explore timely and relevant topics affecting our world today and build on skills learned in the first GIS course. The structure of the course will be a mix of individual and project-based group work.

Topics covered include Web-based GIS (Google Maps, Github / ArcGIS / Mapbox integrations for web-based output), Production GIS (project management, customization, project scoping and delivery), and Spatial Data Science. Additional, timely topics may be introduced as the course progresses.

Important note: this course is not simply part II of the introductory GIS course! This course is designed to help you build additional skills and supporting techniques for applying GIS in a real-world environment. So while some assignments integrate tutorial-led instruction on topics ranging from training object detection models to utilizing new spatial data analysis tools, this course will feel different. You will engage in more project management work, develop bids and analyze GIS projects for ethical considerations among other things. There are a lot of good tutorials for continuing where you left off after the intro course if that's more what you're looking for. This course is designed to ensure you also

have a solid background in other supportive skills that are essential if you plan on providing GIS support in a consulting environment. If you're unsure what to expect or what this all means, feel free to reach out.

A solid foundation in Geographic Information Systems in general and significant experience with ArcGIS Pro is required. Students should feel comfortable investigating and working with applications and methods unfamiliar to them without always having the benefit of a step-by-step guide, and demonstrate a willingness to learn, experiment and take initiative when working on individual and group-based project work. As mentioned elsewhere, this course assumes you anticipate using GIS in a real-world environment, so in some cases assignments will presume you already have a solid understanding of how the software works.

Learning outcomes

1. Learn to apply and further build on your GIS skills to produce real products and services.
2. Learn how to manage and scope GIS projects, work on GIS teams, and deliver GIS resources.
3. Utilize and integrate other GIS technologies (e.g. MapBox, others) to meet real-world needs, affect change and integrate data into other platforms.
4. Explore the world of Spatial Data Science and gain insights into how to conduct more advanced geospatial analysis.
5. Analyze key geospatial technology challenges and opportunities of the present, near-present and future through the lens of ethical use, personal privacy and policy.
6. Develop an on-line portfolio that represents your learning.

Course text

A good reference text for some of the techniques covered is the following. When purchasing this text, make sure to get the 2nd Edition.

The Esri Guide to GIS Analysis, Volume 2: Spatial Measurements and Statistics (2nd Edition).
By: Andy Mitchell; Lauren Scott Griffin
Publisher: Environmental Systems Research
Print ISBN: 9781589486096, 1589486099
eText ISBN: 9781589486096, 1589486099
Edition: 2nd
Format: Reflowable

https://www.vitalsource.com/referral?term=9781589486096 (https://www.vitalsource.com/referral?term=9781589486096)

Assessments

The final course grade will be calculated using the following categories:

Assessment	Percentage of Final Grade
Online portfolio	10%
Assignments	40%
Final project	30%
Challenge exercises	20%

Setting up your online portfolio - 10%

One of your first activities will involve setting up your online portfolio. You'll be responsible for staging the online portfolio on-line either through one of the suggested methods discussed in class or through an acceptable alternative method. The online portfolio will serve as your public-facing work folder, where you'll collect relevant lab exercise examples and other materials and information related to your final project. The online portfolio will also serve as a record of your accomplishments in the course so you can easily refer back to it later, and use it as a resource for future work and / or whatever career path you choose.

You'll be graded on developing your online portfolio on-time and with all the necessary components identified when this topic is covered during the course. As the course progresses, it will be your responsibility to keep this content fresh, reflecting your progress in the course as your work materials evolve.

Assignments - 40%

A large portion of your grade will be awarded through the completion of weekly assignments, discussion board exercises or quizzes. Weekly assignments may sometimes be a combination of in-class exercises and homework. The assignments will provide a hands-on opportunity for you to explore various aspects of Geographic Information Systems with the idea of building some tangible examples you can refer back to in the future. The weekly assignments will also be your opportunity to expand on skills you already have, learn new ones, and demonstrate proficiency in the tools covered.

You are encouraged to expand the scope of weekly assignments to explore areas you're particularly interested in learning more about.

Final Project - 30%

The final project will be your opportunity to put everything you've learned so far into action.

You will be responsible for developing the following:

- A project proposal. This will be the outline for your project - identifying the goals of your project, your sources of data, story and method for presenting this information.
- A final deliverable that is publicly accessible and expands your knowledge of at least one or two of the technologies and / or topics covered in the course.
- A final presentation.

Challenge exercises - 20%

Throughout this course you'll have the opportunity to complete challenge exercises. Challenge exercises are designed to provide you with a way to build new skills and keep existing skills sharp. Sometimes they will be announced ahead of time, other times they won't. You can think of challenge exercises as a relatively low-risk way to build confidence in your GIS skills and prepare yourself to function in a consulting environment where your GIS skills will be in demand.

Communication

Clarification and discussion of GIS concepts and procedural knowledge are not limited just to lectures and lab sessions. To get the most out of your experience, post questions and / or comments of general relevance directly to the discussion boards. This allows the instructor and / or TA to answer questions that multiple students may have, or address technical issues that more than one student may be experiencing. Likewise, if you see a question you think you can answer on the discussion board, please do! This helps everyone build stronger GIS and analytic skills. We will regularly monitor the discussion board for questions and generally try to respond within 24 hours. If you have questions that are more personal in nature you are welcome to send an email directly, but please default to the discussion board when possible.

Other opportunities to connect with the instructor and TA include office hours which will be posted on Canvas shortly after the start of the course.

Course Policies

University's policy on accommodations: Accommodations, academic adjustments, and auxiliary aids and services (collectively “accommodations”) are provided to students with disabilities, as required by the Americans with Disabilities Act (ADA), the Rehabilitation Act of 1973, and other applicable federal, state and local laws. Please refer to CMU’s website for information.

Course Recordings for Synchronous Classes

Note: This section generally only applies if the course is being taught remotely. If the course is being taught in-person, lectures will not be recorded or posted to Canvas. For this reason it's important to attend all in-person lectures.

Unless otherwise stated, synchronous classes taught remotely will be recorded via Zoom so that students in this course (and only students in this course) can watch or re-watch past class sessions. Please note that breakout rooms will not be recorded. I will make the recordings available on Canvas as soon as possible after each class session (usually within 3 hours of the class meeting). Recordings will live in our Canvas website. Please note that you are not allowed to share or repost these recordings. This is to protect your FERPA rights and those of your fellow students.

Accommodations for students with disabilities: If you have a disability and have an accommodations letter from the Disability Resources office, I encourage you to discuss your accommodations and needs with me as early in the semester as possible. I will work with you to ensure that accommodations are provided as appropriate. If you suspect that you may have a disability and would benefit from accommodations but are not yet registered with the Office of Disability Resources, I encourage you to contact them at **access@andrew.cmu.edu (mailto:access@andrew.cmu.edu)** .

Statement on student wellness: As a student, you may experience a range of challenges that can interfere with learning, such as strained relationships, increased anxiety, substance use, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may diminish your academic performance and/or reduce your ability to participate in daily activities. CMU services are available, and treatment does work. You can learn more about confidential mental health services available on campus at: **http://www.cmu.edu/counseling/ (http://www.cmu.edu/counseling/)** . Support is always available (24/7) from Counseling and Psychological Services: 412-268-2922.

Laptops and other Mobile Devices: In general this is a course that uses a lot of technology, so it's expected that on most days you'll have your laptop and phone with you. With that said, it's your responsibility to be respectful when using these devices. Keep your phone on silent, don't talk on the phone while in class, don't distract others by viewing content on your laptop or phone not relevant to the course, and no technical devices are allowed for any quizzes or tests administered through this course unless explicitly stated by the professor.

Grading Policies

Late-work policy: Late work for this course will not be accepted after the due date unless previously arranged with the professor to do extraordinary circumstances (for example, illness, family emergency, out of town). It is important to stay up-to-date on assignments since they will often build on the previous assignment's materials.

Re-grade policy: If you think there has been a technical error in the grading of your assignment, you should e-mail the grader within one week of receiving the grading assignment, otherwise the assignment will not be regraded. You must provide justification for the re-grade in writing along with your request.

Academic Integrity & Collaboration

This course will follow Heinz College policies on ethics and discipline as stated in student handbooks.

A specific policy of this course is as follows:

Homework assignments: Do not copy or modify homework solutions for your homework solutions. Homework must be individual work unless otherwise stated. You may consult each other on clarification, technical and conceptual issues, but you must do individual problem solving and derive your own solutions, including your own computer work.

GIS assets for the final project should also be your own work - not the reposting of analysis done by someone else and / or found somewhere else on the internet. Content for the mid-term case study and your final project also needs to be your own work, and any images used should not infringe on someone else's copyright. It is your responsibility to ensure you adequately cite all materials used correctly in this course. Further guidance on acceptable use of imagery can be found on Canvas.

You are not permitted to be in possession of or reference any assignments from another student or other source either from the current semester or from past semesters, whether they are electronic or paper. Possession of or the sharing such files constitutes an infraction of the academic integrity policies of this course.

You are not permitted to create, edit or revise assignments submitted electronically (e.g. on ArcGIS Online) after the due date.

By remaining enrolled, you consent to this policy.

Diversity, Equity and Inclusion

We must treat every individual with respect. We are diverse in many ways, and this diversity is fundamental to building and maintaining an equitable and inclusive campus community. Diversity can refer to multiple ways that we identify ourselves, including but not limited to race, color, national origin, language, sex, disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status, or genetic information. Each of these diverse identities, along with many others not mentioned here, shape the perspectives our students, faculty, and staff bring to our campus.

Each of us is responsible for creating a safer, more inclusive environment. Unfortunately, incidents of bias or discrimination do occur, whether intentional or unintentional. They contribute to creating an unwelcoming environment for individuals and groups at the university. If you experience or observe unfair or hostile treatment, you can take advantage of the following resources:

- **Center for Student Diversity and Inclusion: csdi@andrew.cmu.edu (mailto:csdi@andrew.cmu.edu)** , (412) 268-2150
- **Report-It (http://www.reportit.net/) online anonymous reporting platform: reportit.net (http://www.reportit.net/)** username**:** *tartans* password**:** *plaid*

All reports will be documented and deliberated to determine if there should be any following actions.

Calendar

Week one (03/13 - 3/19)

First class will be held on Monday, March 13th

Weekly assignment due March 19th

Week two (03/20 - 03/26)

Weekly assignment due March 26th

Week three (03/27 - 04/02)

Weekly assignment due April 2nd

Week four (04/03 - 04/09)

Weekly assignment due April 9th

Week five (04/10 - 04/16)

Weekly assignment due April 16th

Final project proposal due

Week six (04/17 - 04/23)

Weekly assignment due April 23rd

- Final project work

Week seven (04/24 - 04/28*)

*** Last day of mini 4 is Friday, April 28th.**

Final project due, final presentations