

## GEOL 1446/2446 Advanced GIS and Computer Methods

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### Notes

My office hours are given above and will be held in 504 SRCC. In addition, please contact me by e-mail for more details on this particular class or any concerns that you might have. It is very important that you keep up with all reading and assignments. The generous support of this course and Geographical Information Systems at the Department of Geology and Environmental Science at the University of Pittsburgh by Environmental Systems Research Incorporated (ESRI), and the Alfred P. Sloan Foundation are very gratefully acknowledged. Anytime you see me you are welcome to discuss topics of interest or concern. You are welcome to check my web site for additional information and links. There is no textbook for this class, but much material online and within on-line courses and tutorials that are completed. You must have an [www.esri.com](http://www.esri.com) account, and use your "pitt.edu" email address as the primary email contact address.

**Course Grade:** There will be numerous homeworks, and an in-class midterm and in-class final. The course grade will be a combination of scores from the homeworks (50%) and the tests (Midterm 1: 20%, Final (cumulative) 30%).

Initial Assignment:

**Read** "*Getting Started*", pages 3-61; in *Using ArcGIS Spatial Analyst*.

Review the "*Using ArcGIS Spatial Analyst Tutorial*."

Read "*Understanding rasters and analysis*", pages 73-106; in *Using ArcGIS Spatial Analyst*. Continue to work on "*Using ArcGIS Spatial Analyst*" Tutorial.

Read "*Performing analysis*", pages 109-186; Appendix A, pages 191-199. ; in *Using ArcGIS Spatial Analyst*. Finish "*Using ArcGIS Spatial Analyst*" Tutorial.

Access Datasets required to complete "*Using ArcGIS Spatial Analyst*". Complete pages 1-54.

Read textbook PDF "*Using ArcGIS 3D Analyst*".

Finish reading our second textbook PDF "*Using ArcGIS 3D Analyst*".

Read PDF textbook "*Using Geostatistical Analyst Tutorial*"

Read PDF textbook "*Using Network Analyst Tutorial*"

Numerous on-line courses are assigned. In addition the student selects four additional courses to complete in their area of interest.

Timeline for Course Milestones

**January**

Week 1 - Read "Getting Started", pages 3-61; in Using ArcGIS Spatial Analyst.

Review the Using ArcGIS Spatial Analyst Tutorial. Review 3D Analyst Tutorial.

Week 2 - Introduction and overview of course

Review SQL, GPS, Map Projections and Earth Shape Models  
Review data types, workflows, and project design and pitfalls.

Begin working on the on-line 3D Analyst Course.

Please read our PDF textbook "Using ArcGIS 3D Analyst".

Read "Understanding rasters and analysis", pages 73-106; in Using ArcGIS Spatial Analyst.

### **Complete on-line classes:**

- Creating 3D Data using ArcGIS
- 3D Analysis of Surfaces and Features using ArcGIS
- Visualization Techniques Using ArcGIS

Week 3 - Prepare for work on "ArcGIS Spatial Analyst" on-line course.

Read "Performing analysis", pages 109-186; Appendix A, pages 191-199. ; in Using ArcGIS Spatial Analyst.

Access Datasets required to complete "Using ArcGIS Spatial Analyst". Complete pages 1-54.

Summary of concepts related to Spatial Analyst

Week 4 - Read "Using ArcGIS Geostatistical Analyst". Required reading is between pages 1-284.

### **Complete on-line classes**

- Sharpen your skills-Spatial Analysis 101
- Getting Starting with Spatial Analysis
- Solving Spatial Problems Using ArcGIS
- Exploring Spatial Patterns in Your Data using ArcGIS
- Using Raster Data for Site Selection
- Distance Analysis Using ArcGIS
- Basics of Raster Data. (for Graduate Section)

**February**

Week 1: HOMEWORK: Complete and print out the certificates showing that you have finished the on-line courses for Spatial Analyst and 3-D Analyst.

Present Geostatistics. Summary of concepts related to Spatial Analyst. Assign Geostatistical Analyst Tutorial homework: Access Datasets required, and complete, the Geostatistical Analyst Tutorial.

Week 2:: Complete and print out the required maps for the Geostatistical Analyst Tutorial. Note that this is a five part tutorial described in the "Course Documents" section of our web site. Review for midterm.

Week 3: Midterm, multiple choice: Planned for mid February. 1 hour and 30 minutes; Test will be approximately 20 questions. Please see study guide. Questions will be taken directly from this study guide.

Week 4: Return graded midterm. Present Geocoding and Network Analyst material. Assign on-line course.

**Complete on-line courses:**

- Performing unsupervised pixel-based image classification
- Introduction to Suitability Modeling
- ArcGIS Data Interoperability in Action.

**March**

Week 1: Continue presenting Geocoding and Network Analyst material.

**Complete Network Analyst Tutorial.**

Week 2: Spring Vacation: No class during Spring Vacation ().

Week 3: Return from break Course Review covering Spatial, 3D, Geostatistical, Geocoding and Network Analysis.

**Midterm: Third week of March.**

Web-based GIS. Introduction to the WWW. Opportunities and Dangers. Introduction to Web based mapping applications.

- University Holiday (Spring Vacation)

**April**

**Homework Assignments:**

- Complete Doppler Radar
- Complete Cave Model and Hydrology
- Complete Groundwater Geochemistry

-PLEASE FINISH ALL HOMEWORKS

- Hand in Geohazards Certificate.

Our multiple choice FINAL EXAM is closed book and includes all material covered.

I hope you enjoyed our advanced GIS course and wish each of you the best of luck in your future careers.

Course Grade: There will be numerous homeworks, and an in-class midterm and in-class final. The course grade for the undergraduate level of this course will be a combination of scores from the homeworks (50%) and the tests (Midterm 1: 20%, Final (cumulative) 30%).

*In this course, students, faculty and guests represent diverse perspectives, backgrounds, and experiences, which enriches our classes. Individuals of all races, colors, ancestries, sexes, marital status, familial status, ages, backgrounds, beliefs, ethnicities, gender identities and expressions, national origins, religious or political affiliations, sexual orientations, abilities, and other visible and nonvisible differences are welcomed. Every person in this classroom should feel responsible for creating a space that is intellectually rigorous and is a respectful, welcoming and inclusive environment for every individual. We urge all to be mindful of the ways that our identities position us in the classroom. While intellectual disagreement may be constructive, no harsh statements, or demeaning or discriminatory behavior will be permitted. If you feel uncomfortable, please feel free to approach me to discuss the situation.*

*In this class, we will have the chance to indicate the name that we prefer to be called and, if we choose, to identify pronouns with which we would like to be addressed. I will do my best to address and refer to all students accordingly and support classmates in doing so as well. I will endeavor to use gender-inclusive and nondiscriminatory language in all course communication and materials. Your suggestions for how to improve the effectiveness of the course for you personally or for other student groups are encouraged and appreciated. Our faculty is committed to communication from students without judgement. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you.*