

Advanced Geographic Information Systems (GIS)

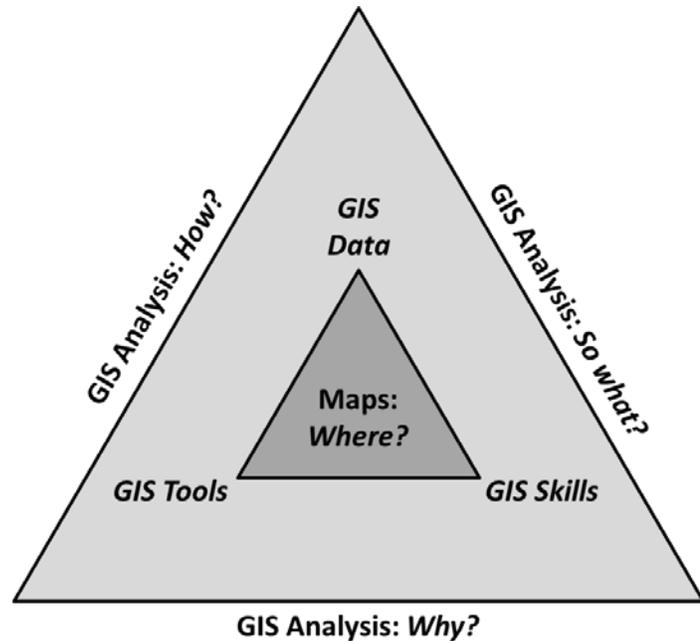
GARP 0344-001 – Spring 2012 – CRN 30995

1) What is Advanced GIS?

This course builds upon the skills and knowledge you acquired during the 'Introduction to GIS' course. I think of 'Advanced GIS' as 'Advanced and Applied GIS' in the sense that this course is designed to be applicable to your own interests and future needs.

We will expand GIS and geospatial data from merely 'making maps' to meaningful geospatial data analysis and data collection – using GIS as a problem-solving tool.

In this sense this course is not necessarily any more difficult than GARP 0244, but introduces you to new GIS tools, ArcGIS extensions, data types, and analytical applications.



2) Learning Goals

- 1) GIS Knowledge
Geospatial concepts and intelligent mapping using GIS software (especially ArcGIS 10), evaluation/acquisition/creation of geospatial data, and quantitative geospatial analysis.
- 2) Skills and Critical Thinking
Application of GIS knowledge to relevant real-world situations and problems. Intellectual inquiry, critical analysis, and effective communication using maps.
- 3) Perspective
Space, spatial patterns, and spatial relationships as global organizing concepts. GIS as a tool for a variety of applications and disciplines

3) Your Instructor

Dr. Carsten Braun	Email	cbraun@westfield.ma.edu
	Phone and office	413-572-5595, Wilson 201
	Office Hours	TR, 10:30 to 12:00
	Web	www.westfield.ma.edu/cbraun

➔ If you feel that you are not progressing as well as you hoped, please feel free to talk to me during my office hours or a mutually convenient time – the sooner the better! Please do not wait until the end of the semester. I'm happy to support you to help you succeed.

4) Time, Location, Numbers

- GARP 0244-001; CRN 30995, 3 credit hours
- Tuesday and Thursday, 08:15 to 09:30, Bates 22 GIS Technology Center

We meet formally twice every week. Therefore, missing class (for any reason) leaves you with a considerable gap in your learning process. You will spend significant additional time each week outside of class practicing with the software and working on our tutorials, exercises, homework assignments, and GIS projects.

Please realize that this is a ‘scaffold’ course = each week builds the knowledge you need for the next week and it is therefore critical to constantly keep-up with the weekly course material. You cannot ‘skip’ a weekly assignment in this course!

This is a high-powered, difficult, and time-consuming elective course with complex content that requires a substantial amount of work to be successful! This is not an easy course to fill-out your schedule!

It may be necessary to meet (occasionally) at different times and locations in order to complete some of the data collection or meet with local GUS users. It may also be beneficial to meet on weekends. We will make every effort to account for everyone’s needs and responsibilities when scheduling extra or longer meetings.

5) Prerequisites

GARP 0244 and robust computer and mathematical/statistical skills (e.g. knowledge of Microsoft Excel). Please consult with me if you have any concerns.

- I will not be teaching basic computer skills!
- I assume that you still understand and remember all that you learned in GARP 0244. Otherwise it is your responsibility to review the material again on your own time.

6) Required Course Resources

A dedicated USB flash drive

- A dedicated USB flash drive is required for this course (in order to save your data, exercises, assignments, and GIS projects). Required size: 4 GB or greater.

Standard 3-ring binder

- To organize the weekly course materials and graded assignments/projects.

Google Account and ESRI Global Account

- Google Account: <https://accounts.google.com/NewAccount>
- ESRI Global Account: <https://webaccounts.esri.com/cas/index.cfm>

We will not use a required textbook for this course, but instead use material I created or available for free:

- ArcGIS Desktop Help and ArcTutor material
- ArcGIS Desktop Resource Center: <http://resources.arcgis.com/>
- ArcLessons: <http://edcommunity.esri.com/arclessons/arclessons.cfm>
- Free ESRI Training: <http://training.esri.com/gateway/index.cfm>

7) Optional Course Resources

There are many great books available to teach yourself GIS and I encourage you to purchase one or more for your own benefit.

- GIS Tutorial 1: Basic Workbook, 4th Edition ESRI Press, ISBN 9781589482593
- GIS Tutorial 2: Spatial Analysis Workbook, 2nd Edition, ESRI Press, ISBN 9781589482586
- GIS Tutorial 3: Advanced Workbook, ESRI Press, ISBN 9781589482074
- GIS Tutorial for Crime Analysis, ESRI Press, ISBN 9781589482142
- Getting to Know ArcGIS Desktop. 2nd Edition, Updated for ArcGIS10, ESRI Press, ISBN 9781589482609
- The GIS 20: Essential Skills, ESRI Press, ISBN 9781589482562
- Mastering ArcGIS, 5th Edition, McGraw-Hill, ISBN 9780077462956

More books: <http://esripress.esri.com/>

8) Course Logistics – The Big Picture

Geospatial software and databases are complex – ‘learning-by-doing’ is therefore the most appropriate and efficient teaching/learning strategy. We will create a cooperative learning environment by supporting each other in order to understand concepts and to solve problems. However, you are always responsible to submit your own original work by the assigned due dates.

I expect a high level of individual effort and engagement. What you get out of this class is primarily a function of the amount of effort you put in. This is not a class where you can sit back and wait for ‘learning to happen’. Instead, you have to consistently and actively engage with the tasks, questions, assignments/exercises, and GIS projects in order to (a) learn to use the GIS software and (b) to understand what a GIS can do for you.

If using your own computer...

- Your own computer = your own problem!
- Your own Internet connection = your own problem!
- No support from me or our IT Helpdesk!
- Problems with your own computer are NOT an excuse for late work.

9) Course Logistics – Details

It is your responsibility to complete the homework assignments and projects by the assigned due dates.

- Five major graded homework assignments. In addition, there will be a series of more informal, ungraded (yet mandatory!) assignments to provide additional practice and context.
- Six pre-defined GIS Projects. Project 7 is your own project – something that you find interesting or helpful – detailed instructions and parameters will be provided.

The three Special Topics weeks give us the opportunity for more in-depth analysis or to explore additional GIS tools and applications. We may also collaborate with local GIS users on some of their projects if the opportunity arises.

Assessment

Your final course grade is a function of your performance throughout the entire semester and combines the grades from Homework Assignments and GIS Projects.

- 5 Homework Assignments 30 percent of final grade
- 7 GIS Projects 70 percent of final grade

The assigned due dates are mandatory and critical for your success. 5 point deduction for each late day. No exceptions.

The Fine Print

- Attendance is mandatory – missing class is unacceptable.
- If you have to miss class...you have to inform me beforehand.
- The required resources are mandatory.
- The due dates are mandatory.
- Please be on time and don't leave before the end of class.

Grade Conversion	
A	93-100
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	60-66
F	0-59

10) What is GIS?

The location of objects and their interactions are (often) not random or independent. Instead, the world is characterized by spatial patterns and relationships. A GIS allows us to visualize (= map) and quantify these spatial patterns and relationships.

Geography

- Where? - Why? - How? things occur on Earth
- Geography is to Space what History is to Time.

Geographic Information

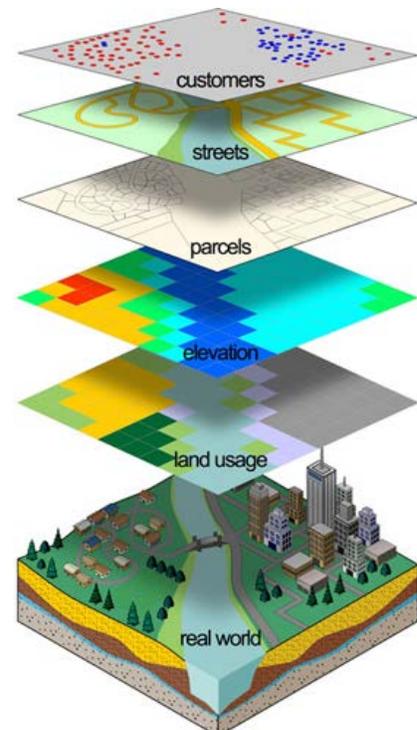
- Information that includes the location of the information in a systematic mathematical format (e.g. street addresses, latitude/longitude, x/y/z coordinates, etc.)

Geographical Information System

- Geographic information that is systematically stored and organized (= inside a database)

→ If you have geographical information, organized in a systematic manner, then you can use a computer for quantitative geographic analysis and visualization.

→ *Intelligent and meaningful maps!*



GARP 0344 Spring 2012 Semester Schedule

Week	Date	Topics	Assignment
Week 1	1/24, 1/26	Refresher: Professional maps using MassGIS data	HW #1
Week 2	1/31, 2/2	GIS is NOT a map!	Project 1
Week 3	2/7, 2/9	GIS Analysis: Site Selection	Project 2
Week 4	2/14, 2/16	Spatial Analyst, Raster Data, and DEMs	HW #2
Week 5	2/23	Spatial Analyst, Raster Data, and DEMs	Project 3
Week 6	2/28, 3/1	GIS Data Sources and Web Mapping	HW #3
Week 7	3/6, 3/8	Special Topics in GIS	tba
Week 8	<i>Spring Break</i>	<i>No classes!</i>	
Week 9	3/20, 3/22	Where am I? Geocoding and Address Mapping	HW #4
Week 10	3/27, 3/29	Network Analysis using ArcGIS	HW #5
Week 11	4/3, 4/5	Network Analysis using ArcGIS	Project 4
Week 12	4/10, 4/12	Census Data Analysis using ArcGIS	Project 5
Week 13	4/17, 4/19	GPS Data Collection and Mapping	Project 6
Week 14	4/24, 4/26	Special Topics in GIS	tba
Week 15	5/1, 5/3	Special Topics in GIS	tba

Notes

- The due dates for the homework assignments and GIS Projects are specified in the instructions.
- Adjustments to the course schedule, requirements, and assessment may be necessary to account for situations that arise over the course of the semester.