

***Advanced Geographical Information Systems (GIS)***  
(GARP 0344, 3 credits)

**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 the content of this course is designed to be applicable to your own interests and future needs.

➔ Essentially, we are taking GIS beyond merely dealing with specific tasks and problems and extending its application into larger problems and projects – using GIS as a tool.

We will spend the first few weeks of the semester refreshing our knowledge of ArcGIS and then explore new themes/aspects of GIS, for example joining/relating of attribute tables, map projections, digital elevation models, 3-D mapping, site location analysis, census data analysis, and GPS mapping. The last few weeks of the semester are intentionally left “open” for in-class project work or special topics of mutual interest.

**Dates/Times/Location**

Monday	15:45 to 17:00	Wilson 139
Wednesday	15:45 to 17:00	Wilson 139

Throughout the semester, it will be necessary to meet (occasionally) at different/longer times/locations in order to complete some of the mapping and data collection tasks in the field. It may also be necessary to meet on the weekend. We will make every effort to account for everyone’s needs and responsibilities when scheduling extra/longer meetings.

**Your Instructor**

Dr. Carsten Braun ([cbraun@wsc.ma.edu](mailto:cbraun@wsc.ma.edu)) 413.572.5595)  
Office: Bates 06; Office Hours: MWF, 12:15 to 13:15 (or anytime by appointment)

If you feel that you are not progressing as well as you hoped, please feel free to talk to me anytime – the sooner the better! My job is to help you succeed.

**Textbook: Getting to Know ArcGIS Desktop (Second Edition)**

Basics of ArcView, ArcEditor, and ArcInfo, Updated for ArcGIS 9  
Ormsby, Napoleon, Burke, Groess, and Feaster  
ESRI Press, 2004, ISBN: 1-58948-083-X, 588 pages

This book is an great resource and reference book to supplement the help functions included in ArcGIS. Each book chapter contains conceptual material followed by scripted software exercises. You will acquire skills in a variety of areas - map symbology, data overlay, map projection, and data conversion, to name a few - as you make maps and analyze geographic data. The book culminates with a set of spatial modeling exercises using the ModelBuilder technology of ArcGIS version 9. ModelBuilder is a graphical environment for representing, automating, and solving spatial analysis problems.

Included with the book is a fully functioning 180-day trial version of ArcView 9.2 software on CD-ROM, as well as a CD of data for working through the book's exercises. Once installed and registered, the single-use software cannot be reinstalled, and the time limit cannot be extended.

- Note: ESRI published the errata for this book for ArcGIS Desktop 9.2 as a separate pdf file (available as hard copy on 01/23/08).
- Other tutorials, exercise data, etc. used throughout the semester will be made available on a GIS file server and as hard copies.

### **Other Required Resources**

1. A USB memory flash drive. Capacity: 1 GB or greater.
2. A notebook and a three-ring binder to organize notes, hand-outs, and tutorials.

### **Projects/Due Dates/Assessment**

We will be working on 6 real projects and 2 quasi-projects over the course of the semester, resulting in eight grades that will form the basis of the evaluation as detailed below.

#### **1) Chapter 1 – 13 in “Getting to Know ArcGIS desktop”**

- Start Date: 01/23/2008; Due Date: 02/08/2008; 5 percent of final grade.
- Deliverables: Report/write-up for each chapter, 1 printed map for each chapter exercise.

#### **2) Chapter 14 – 20 in “Getting to Know ArcGIS desktop”**

- Start Date: 02/25/2008; Due Date: 03/19/2008; 5 percent of final grade.
- Deliverables: Report/write-up for each chapter, 1 printed map for each chapter exercise.

#### **3) Review Project**

- Start Date: 01/23/2008; Due Date: 02/08/2008; 5 percent of final grade.
- Deliverables: Map(s), report.

#### **4) Group Project: GPS Mapping in Stanley Park**

- Start Date: 02/11/2008; Due Date: 04/16/2008; 15 percent of final grade.
- We'll map all the hiking trails and points of interest (e.g. bridges, etc.) in Stanley Park using GPS receivers. This will require considerable hiking through snow...be prepared!
- Deliverables: Large-format map with pictures and explanatory text, 8.5 by 11 inches flyer, jpg/pdf file for WWW, kml/kmz file for Google Earth.

#### **5) Census Data Project**

- Start Date: 03/03/2008; Due Date 04/16/2008; 15 percent of final grade.
- Here you get to use and explore the 2000 census data available from MassGIS to evaluate spatial demographic trends and patterns at the census tract level.
- Deliverables: Large-format map, report, file geodatabase for the project.

#### **6) Mt. St. Helens Project**

- Start Date: 03/17/2008; Due Date: 04/02/2008; 5 percent of final grade.
- A quick and easy project to learn the basics of 3-D data in ArcMap and ArcScene
- Deliverables: Map(s), report.

### 7) Three-dimensional Site Selection Project for a town in the Berkshires

- Start Date: 04/07/2008; Due Date: 04/30/2008; 15 percent of final grade.
- A site selection project using a digital elevation model to determine suitable building sites based on slope and aspect.
- Deliverables: Large-format map, report, file geodatabase for the project.

### 8) Your own GIS Project (35 percent of final grade)

Here you get to do whatever you want...with prior approval. You will plan, conduct, and complete a meaningful GIS project on your own, but you can share resources and skills with other students in the class. The project has to include some level of quantitative spatial analysis – it is not sufficient to just make a beautiful map.

- Exceptions to the rules above require prior approval.
- The due dates below are mandatory and will be part of the overall project assessment.
- I have a few ideas for projects...but I prefer you creating your own project.
- Deliverables: Large-format map, report, file geodatabase for the project.

01/23 Start of project  
02/13 Select project topic (inform me via email)  
03/07 2 page report on background research, data collection/availability/sources, etc.  
04/16 2 page progress report, including draft maps  
05/02 All deliverables due  
05/07 Project presentations (mandatory)

- ➔ I expect high-quality, on-time work on all these projects.
- ➔ As always, I'm happy to review these projects *prior* to their due dates to ensure a high-quality, on-time project.
- ➔ The due dates are mandatory (and part of the project assessment). Extensions will be granted only in exceptional circumstances.

### The Fine Print...

- Attendance is mandatory. If you have to miss a class...inform me in advance.
- It is your responsibility to keep up with the material, hand-outs, due dates, projects, etc. over the course of the semester.
- It is your responsibility to seek additional help and support as needed.

Letter	Points	Letter	Points	Letter	Points
A	93 to 100	B-	80 to 82	D+	67 to 69
A-	90 to 92	C+	77 to 79	D	63 to 66
B+	87 to 89	C	73 to 76	D-	55 to 62
B	83 to 86	C-	70 to 72	F	<55

### Spring 2008 Class Schedule (GARP 0344)

Week	Class	Date	Theme/Topic	Details
Week 1	Class 1	01/23 (We)	Course Overview, syllabus	Start Ch.1-13, Review Project
Week 2	Class 2 Class 3	01/28 (Mo) 01/30 (We)	Ch.1-13, Review Project Ch.1-13, Review Project	
Week 3	Class 4 Class 5	02/04 (Mo) 02/06 (We)	Ch.1-13, Review Project Ch.1-13, Review Project	Due Date (both): 02/08/2008
Week 4	Class 6 Class 7	02/11 (Mo) 02/13 (We)	Mapping: GPS, Google Earth Work on Group Mapping Project	Start Group Mapping Project GPS Mapping in Stanley Park
Week 5	No class Class 8	02/18 (Mo) 02/20 (We=Mo)	Work on Group Mapping Project	Due Date: 04/16/2008
Week 6	Class 9 Class 10	02/25 (Mo) 02/27 (We)	Ch. 14-20 Ch. 14-20	Due Date: 03/07/2008
Week 7	Class 11 Class 12	03/03 (Mo) 03/05 (We)	Census Data Work on Census Data Project	Start Census Data Project Due Date: 04/16/2008
Week 8	Sprg Brk Sprg Brk	03/10 (Mo) 03/12 (We)		
Week 9	Class 13 Class 14	03/17 (Mo) 03/19 (We)	Digital Elevation Models Work on Mt. St. Helens Project	Start Mt. St. Helens Project Due Date: 04/02/2008
Week 10	Class 15 Class 16	03/24 (Mo) 03/26 (We)	Using 3-D Analyst Using 3-D Analyst	Tutorial/hand-out
Week 11	Class 17 Class 18	03/31 (Mo) 04/02 (We)	Using Spatial Analyst Using Spatial Analyst	Tutorial/hand-out
Week 12	Class 19 Class 20	04/07 (Mo) 04/09 (We)	MassGIS DEM Start Site Location Project	Due Date: 04/30/2008
Week 13	Class 21 Class 22	04/14 (Mo) 04/16 (We)	Work on Projects Work on Projects	
Week 14	Class 23 Class 24	04/22 (Tu=Mo) 04/23 (We)	Work on Projects Work on Projects	
Week 15	Class 25 Class 26	04/28 (Mo) 04/30 (We)	Special Topics Special Topics	
Week 16	Class 27 Class 28	05/05 (Mo) 05/07 (We)	Semester Wrap-up Project Presentations	

#### Notes

- Tuesday (13 May 2008, 12:00) is the final dead line to receive at least partial credit for late work.
- Adjustments to the course schedule may be required to account for unforeseeable or unavoidable situations during the semester.