

***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.

- ➔ 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 problem-solving tool.
- ➔ We will expand our use of GIS and geospatial data from merely ‘making maps’ to meaningful geospatial data analysis and data collection.

**Dates/Times/Location**

Monday	15:10 to 16:25	GIST Center
Wednesday	15:10 to 16:25	GIST Center

Throughout the semester, it will be necessary to meet (occasionally) at different/longer times and locations in order to complete some of the mapping and data collection tasks in the field. It may also be necessary to meet on weekends. 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 #1: Getting to Know ArcGIS Desktop, 2<sup>nd</sup> Edition, Updated for ArcGIS 9.3**

Basics of ArcView, ArcEditor, and ArcInfo  
Ormsby, Napoleon, Burke, Grossl, and Bowden  
ESRI Press, 2008, ISBN: 978-1589482104, 600 pages

This book is a 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 9.3 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: This is the updated edition for ArcGIS 9.3 – do NOT buy an older version of this book. It will NOT work with ArcGIS 9.3.

## **Textbook #2: Google SketchUp for Dummies**

Aidan Chopra

For Dummies, 2007, ISBN: 978-0470137444, 432 pages

This fun and friendly book assumes no previous 3D modeling experience and explains the basic concepts involved in 3D modeling. It shows readers how to build a 3D model, print it, share it, export it to another professional design package, export it to Google Earth, and create a 3D animated tour. Now you can add content to Google Earth with 3D buildings and other structures.

The author (Aidan Chopra) also maintains a free companion WWW-site, which includes very helpful how-to videos for each book chapter: <http://www.aidanchopra.com/>

## **Other Required Resources**

1. A dedicated USB memory flash drive. Capacity: 2 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 seven real projects over the course of the semester, resulting in seven grades that will form the basis of the course assessment as detailed below.

### **1) ArcGIS Refresher Project (10 percent)**

- Work through Chapters 1 to 20 in '*Getting to Know ArcGIS Desktop*'.
- Start Date: 01/21/2009; Due Date 02/09/2009.
- Deliverables: Report/write-up for each chapter, printed maps for each chapter exercise.

### **2) Spatial Analysis Project (GIS-based site selection) (10 percent)**

- Start Date: 02/09/2009; Due Date: 02/23/2009.
- Deliverables: map(s), project report.

### **3) Google SketchUp Project (10 percent)**

- Start Date: 01/26/2009; Due Date: 03/09/2009.
- Deliverables: geo-referenced building model, project report.
- We will create geo-referenced 3D models of a WSC campus or downtown Westfield buildings.

### **4) Raster Data Project (10 percent)**

- Start Date: 03/02/2009; Due Date: 03/30/2009.
- Deliverables: Large-format map, project report.
- A 3-D site selection project using digital elevation models and wind speed grids to determine suitable building sites based on slope, aspect, and available wind power.

### 5) GPS Mapping Project (10 percent)

- Start Date: 02/17/2009; Due Date: 04/13/2009.
- 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, project report.
- We will map parts of Stanley Park and/or collaborate with the GIS Coordinator for the City of Westfield. This may be a group project, depending on the circumstances.

### 6) Network Analyst Project (10 percent)

- Start Date: 03/30/2009; Due Date: 04/29/2009.
- Deliverables: Large-format map, project report.
- Here we will create a travel time / transportation model for a location in Massachusetts.

### 7) Semester GIS Project (40 percent)

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.

- This project has to include quantitative data analysis and/or advanced data manipulation and/or significant original data collection. Downloading some data and creating a map is insufficient. Making a simple map with GPS is also insufficient.
- You have to organize this project as a file geodatabase.
- Exceptions to the rules above require prior approval.
- The due dates below are mandatory and are part of the overall project assessment.
- Deliverables: Large-format map, project report.

01/21 Start of the project.

02/11 Select your project topic and inform me by email.

02/25 3 page progress report with flow chart is due. Include your background research, data collection, data availability, data sources, and analytical steps.

04/15 5 page progress report is due, which has to include meaningful draft maps and a detailed documentation of your completed and planned project steps.

05/04 All deliverables are due, project presentations.

- ➔ 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.
- ➔ 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 course 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	60 to 66
B+	87 to 89	C	73 to 76	F	< 59
B	83 to 86	C-	70 to 72		

### Spring 2009 Class Schedule (GARP 0344)

Week	Class	Date	Theme/Topic	Details/Assignments
Week 1	Class 1	01/21 (We)	Course Overview, syllabus	ArcGIS 9.3 / MassGIS refresher
Week 2	Class 2 Class 3	01/26 (Mo) 01/28 (We)	Google SketchUp Google SketchUp	
Week 3	Class 4 Class 5	02/02 (Mo) 02/04 (We)	Google SketchUp Google SketchUp	
Week 4	Class 6 Class 7	02/09 (Mo) 02/11 (We)	Spatial Analysis, Part I Spatial Analysis, Part II	ArcGIS Refresher Project due
Week 5	Class 8 Class 9	02/17 (Tu=Mo) 02/18 (We)	Mapping with GPS, Part I Mapping with GPS, Part II	
Week 6	Class 10 Class 11	02/23 (Mo) 02/25 (We)	Work on Semester GIS Project Work on Semester GIS Project	Spatial Analysis Project due
Week 7	Class 12 Class 13	03/02 (Mo) 03/04 (We)	Raster Data, Part I Raster Data, Part II	
Week 8	Class 14 Class 15	03/09 (Mo) 03/11 (We)	Raster Data, Part III Raster Data, Part IV	SketchUp Project due
Week 9	No class No class	03/16 (Mo) 03/18 (We)	Spring Break Spring Break	
Week 10	Class 16 Class 17	03/23 (Mo) 03/25 (We)	Spatial Analysis, Part III Spatial Analysis, Part IV	
Week 11	Class 18 Class 19	03/30 (Mo) 04/01 (We)	Network Analyst, Part I Network Analyst, Part II	Raster Data Project due
Week 12	Class 20 Class 21	04/06 (Mo) 04/08 (We)	Census Data, Part I Census Data, Part II	
Week 13	Class 22 Class 23	04/13 (Mo) 04/15 (We)	Special Topics Special Topics	GPS Mapping Project due
Week 14	<b>No class</b> <b>No class</b>	04/20 (Mo) 04/22 (We)	Patriots Day CB at conference	Work on Projects Work on Projects
Week 15	<b>No class</b> Class 24 <b>No class</b>	04/27 (Mo) 04/29 (We) 05/01 (Fr=We)	CB on All-Day Field Trip Special Topics CB at conference	Work on Projects Network Analyst Project due Work on Projects
Week 16	Class 25	05/04 (Mo)	Project Presentations	Semester GIS Project due

#### Notes

- Monday (11 May 2009, 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.