# PA 5271: Syllabus - Fall 2015

UNIVERSITY OF MINNESOTA
HUMPHREY SCHOOL OF PUBLIC AFFAIRS

## Course Syllabus

| | |
|---|---|
| **Course Name:** | **PA 5271—GIS Applications in Planning and Policy Analysis** |
| **Instructor/Email:** | Geoff Maas / maas0021@umn.edu |
| **Classroom:** | HHH 85 (Computer Lab) |
| **Time:** | 6:00 – 8:45 pm, Wednesdays |
| **Office Hours:** | 8:45 pm – 10:00 pm (HHH 85) |
| **Credits / Format** | 3.0 credits / Lecture and Lab |

**Introduction:** Geographic Information Systems (GIS) are an important technology supporting the work planning and public policy. Both fields involve exploring location-based issues and GIS facilitates spatial analysis and visualization of phenomena such as crime, poverty, pollution, health, land use, economics, environmental conditions and many others. GIS—a discipline in its own right—is now firmly woven into the fabric of government and many business operations. It is vital that planning and public policy students have a fundamental knowledge of the concepts, usage, processes and potential of GIS technology.

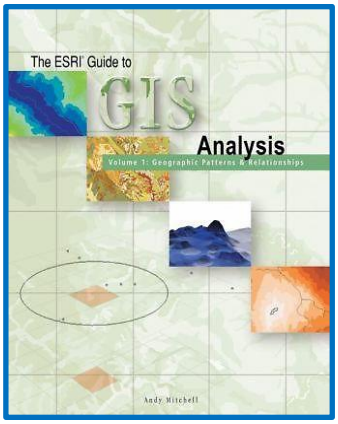
**Course Goals:** Upon completion of this course students can expect to:

- *Be familiar with core terminology, concepts, data types, usage and applications of GIS;*
- *Demonstrate and make use of a foundational set of technical GIS skills;*
- *Have a sound understanding of how GIS can be applied to planning and public policy work;*
- *Be able to communicate and work effectively with experienced GIS professionals in the workforce;*
- *Be able to apply spatial thinking and locational problem solving to the work of planning and public policy;*
- *Be able to frame, address and propose solutions to a diverse variety of planning and public policy problems using GIS technology.*

**Course Overview:** The approach is based upon the assumption that the majority of the students have little or no formal technical experience using GIS. Additionally, it is assumed that as students are seeking a graduate education in the fields of planning and public policy; their primary career intention is not to become deep technical experts or full-time practitioners in GIS. However, being able to perform basic GIS analysis, understand the data, make use of visualization and mapping tools and communicate effectively are core skills expected of planning and public policy professionals.

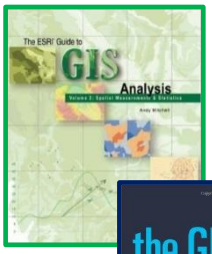
**Primary reference:**

***The ESRI Guide to GIS Analysis, Volume 1***
***Geographic Patters & Relationships***
**Andy Mitchell, ESRI Press**

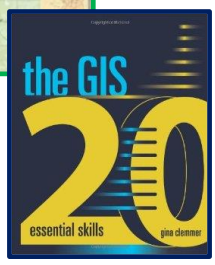



**Recommended (not required) references:**

***The ESRI Guide to GIS Analysis, Volume 2***
***Spatial Measurements & Statistics***
**Andy Mitchell, ESRI Press**




***The GIS 20 Essential Skills***
**Gina Clemmer, ESRI Press**




*Additional readings will be assigned during the semester as they relate to the accompanying lectures and course material.*

**Software and Logistics:** We will be using **ESRI's ArcGIS 10.2.2** software in the HHH 85 lab. Copies of the software are available on all computers in the HHH 85 computer lab. Access to the Humphrey Computer lab (HHH 85) requires only your University of Minnesota student ID card. There are also computers with the software loaded in Rooms 40 and 80 (also requiring student ID card access).


We will be working from the **"T:"** Drive. There are two subdirectories on this drive containing the data and workspaces for the course:

- **PA5271.001 maas0021 Data** contains the general course materials, syllabus, readings, handouts, assignments and datasets;

- **PA5271.001 maas0021 Students** contains the 'workspace' and a group of subfolders, one for each student giving you a private workspace. The instructor has access to each student's workspace as well, and may—from time to time—copy data directly into a student's folder.

**Moodle.** Course materials will also be published on the Moodle site including readings and instructions for assignments and in-class lab exercises.

***Food and drink are not permitted at the workstations in the lab to protect the equipment from damage.*** There are shelves in the back of the lab where food and drink can be stored while you are working. Students are able to take breaks during lecture and lab time as needed.

**Evaluation:** Students will be evaluated based upon performance on four factors:

- A series of eight assignments (8 assignments, 5 points each: 40% of grade);
- Class participation (20% of grade);
- A final project of the student's own design (25% of grade);
- A final examination (15% of grade);

For the final project, students are encouraged to choose a topic to research; a planning or policy issue that aligns with their area of interest or research specialty. The instructor will provide guidance early in the course for helping students to shape, define, refine and begin their final project. Students will present their final projects to the class at the end of the term.

**Student Academic Integrity and Scholastic Dishonesty:** Academic integrity is essential to a positive teaching and learning environment. All students enrolled in University courses are expected to complete coursework responsibilities with fairness and honesty. Failure to do so by seeking unfair advantage over others or misrepresenting someone else's work as your own, can result in disciplinary action. The University Student Conduct Code defines scholastic dishonesty as follows:

*Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering forging , or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis. Within this course, a student responsible for scholastic dishonesty can be assigned a penalty up to and including an "F" or "N" for the course. If you have any questions regarding the expectations for a specific assignment or exam, ask.*

The University of Minnesota's Office for Student Conduct and Academic Integrity's website contains the University's policies and procedures on conduct and disciplinary actions: www.oscai.umn.edu

# PA 5271 Class Schedule and Assignments – Fall 2015

| | | |
|---|---|---|
| ***Week 1:*** | ***Reading:*** | ***Mitchell, Volume 1, pp. 10-15*** |
| **Sept 9** | **Lecture 1:** | **Course Introduction: History and Overview of GIS** |
| | **Lab:** | **Basic ArcCatalog and ArcMap functions, Importing Data** |
| | **Assignment 1:** | **Map sample collection and critique** |
| ***Week 2:*** | ***Reading:*** | ***Kent and Klosterman, 'Pitfalls for Planners'*** |
| **Sept 16** | **Lecture 2:** | **Core Cartographic Principles, Map Design & Data Models** |
| | **Lab:** | **Coordinate Systems and Map Projections** |
| | **Assignment 2:** | **Cartography and Map Layout** |
| ***Week 3:*** | ***Readings:*** | ***Mitchell, Volume 1, pp. 18-19*** |
| **Sept 23** | **Lecture 3:** | **Metadata and Working with Tables and Queries** |
| | **Lab:** | **Joins and Relating Tables Exercise** |
| | **Assignment 3:** | **Urban/Suburban Mortality Rate Analysis** |
| ***Week 4:*** | ***Reading:*** | ***Mitchell, Volume 1, pp. 38-55, 60-62, 66-67*** |
| **Sept 30** | **Lecture 4:** | **Topology Concepts and Census Data** |
| | **Lab:** | **Working with American Community Survey Data** |
| | **Assignment 4:** | **Ramsey County Demographic Analysis Mapping** |
| ***Week 5:*** | ***No class – Independent Lab Session*** | |
| **Oct 7** | **Lab:** | **Working with Census data (Assignment 4)** |
| ***Week 6:*** | ***Reading:*** | ***Mitchell, Volume 1, pp. 90-97, 101-104*** |
| **Oct 14** | **Lecture 5:** | **Working with Land Use, Land Cover, Planned Use and Zoning Data** |
| | **Lab:** | **Exploring ArcGIS Tools: Buffering and Area Calculation** |
| | **Assignment 5:** | **Green Line LRT Corridor Site Analysis** |
| ***Week 7:*** | ***Reading:*** | ***Goldberg, 'A Geocoding Best Practices Guide', pp. 3-18*** |
| **Oct 21** | **Lecture 6:** | **Working With Geocoding, Addressing and Parcel Data** |
| | **Lab:** | **Working with Excel to Prepare Data for Geocoding** |
| | **Assignment 6:** | **Geocoding Data Exercise** |
| ***Week 8:*** | ***Readings:*** | ***Burtman, 'The Revolution Will Be Mapped'*** |
| **Oct 28** | | ***Hopkins, 'Understanding Types of Low Income Neighborhoods'*** |
| | **Lecture 7:** | **Environmental Justice Mapping Applications: Minneapolis-St Paul Example** |
| | **Lab:** | **Geoprocessing Tools** |
| | **Assignment 7:** | **Geoprocessing Tools: Minneapolis Neighborhood Analysis** |
| ***Week 9:*** | ***Reading:*** | ***(no reading)*** |
| **Nov 4** | **Lecture 8:** | **Public Land Survey System** |
| | **Lab 8:** | **ArcGIS Editing Tools** |
| | **Assignment 8:** | **Creating and Editing Features in GIS** |

| | | |
|---|---|---|
| ***Week 10:*** | ***Reading:*** | ***Mitchell, Volume 1, pp. 135-141 & "LIDAR 101" NOAA Publication*** |
| **Nov 11** | **Lecture:** | **GPS, Remote Sensing, LIDAR Data and Spatial Statistics Overview** |
| | | **Road Centerline Data, Hydrography Data and Network Routing** |
| | **Lab:** | **Network Routing Exercise and Raster Data Exercise** |
| ***Week 11:*** | ***Guest Lecture – Practicing GIS Professional*** | |
| **Nov 18** | **Lecture:** | **Web Mapping Applications** |
| | **Lab:** | **Final Project Work Session** |
| ***Week 12:*** | ***Dedicated Lab Working Session w/ Instructor*** | |
| **Nov 25** | **Lab:** | **Final Project Work Session** |
| ***Week 13:*** | ***Student Presentations – Session I*** | |
| **Dec 2** | | |
| ***Week 14:*** | ***Student Presentations – Session II*** | |
| **Dec 9** | | |
| ***Week 15:*** | ***Wrap-Up Lecture, Final Exam Review Session & Course Evaluation*** | |
| **Dec 16** | | |
| ***Week 16:*** | ***Final Exam Week: Dec 17-19, 21-23*** | |
| ***Dec 23, 2015:*** | ***End of Term*** | |