URBDP 404/504: Introduction to Geographic Information Systems (GIS)

AUTUMN 2020

Lecture: Monday | 3:30-4:20 | Online Lab: Wednesday & Friday | 3:30-5:20 | Online

Course Description

URBDP 404/504 is a hands-on introduction to practical knowledge of Geographical Information Systems and Science designed for students in urban planning and related fields. Maps are a powerful tool for both describing and studying urban issues that occur across space. Lectures and labs will discuss and focus on the elements of effectively creating, analyzing, and presenting maps in urban settings. By the end of the course, all students should be functional in basic GIS skills using the ArcGIS software package. Specifically, students can expect to be able to find and manage spatial data, run simple spatial analyses, and present output in maps and data files.

Prerequisites

There are *no prerequisites* for this class. This is an introductory course, but it is helpful if you are familiar with Microsoft Excel or another spreadsheet program. Please note that this course if not for those who have extensive GIS experience. If you already know the basics of GIS and/or have done works with GIS, you should consider taking URBDP 422/522 (Urban and Regional Geospatial Analysis). If you are interested in more in-depth instruction on specific topics and tools (remote sensing, Python programming, web applications, etc.), there are courses provided in the Departments of Urban Planning, Geography, Forest Resources, and others that would be strong follow-ups to this course.

Learning Objectives

- Understand basic concepts and theories of geographic information systems and science, including spatial reasoning, thinking, and data analysis techniques.

- Use GIS to create and manage data, perform spatial analysis, communicate spatial analysis process and results through effective writing, creation of maps, and inclusion of descriptive statistics

- Be aware of data quality and availability issues, as well as limitations and social implications of GIS

- Develop spatial and quantitative analysis skills to effectively study issues in diverse urban settings

Textbook

There is no official required textbook for the course. Instead, readings will be posted on Canvas. There are, however, a wealth of free ArcGIS and online resources available for GIS beginners:

- ArcGIS help
- https://gis.stackexchange.com
- https://community.esri.com

Recommended reference textbooks:

- Mastering ArcGIS by Maribeth Price
- GIS Fundamentals by Paul Bolstad
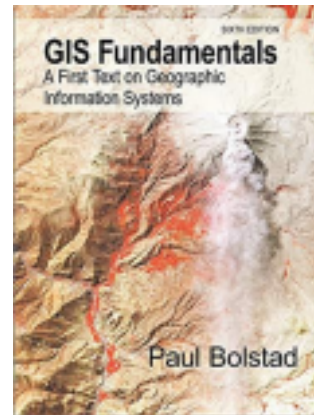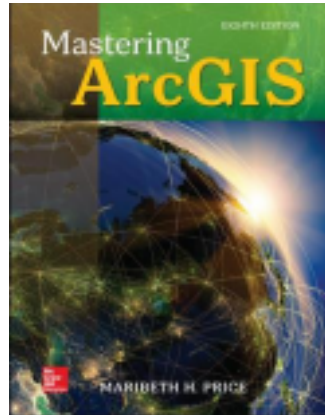
Software

The software we will use in the course is ESRI's ArcGIS. You can remotely control the department computers following the instruction here:

http://be.uw.edu/spaces/computing/software-application-server/

Or you may be able to access desktops with ArcGIS installed in Digital Commons, Gould Hall, or the computer lab in the basement of Suzzallo Library. Here's the information:

http://be.uw.edu/covid-19-information/

> "The Digital Commons computing lab in the basement of Gould Hall will be open for use by CBE students and other UW students taking CBE classes. The Digital Commons Classroom will be closed both to address sanitation and distancing issues, and to allow those computers to be dedicated to remote class use via the CBE Remote access service. To maintain appropriate distancing, in-person capacity of the Digital Commons will be reduced to approximately 16 physically-available workstations. Cleaning supplies are available at the help desk and around the lab. Lab users must use available wipes and cleaner to sanitize their workstation area before and after use. *The Digital Commons help desk will have very limited on-site staffing. Please check the Digital Commons page for staffing details, or email be-help@uw.edu to schedule a time to visit if you need in-person help*."

If you wish to receive a 1-year student copy of ArcGIS, send me an email to obtain an activation code and installation instructions. ArcGIS is only available on Windows.

If you are a macOS user, you have the following options:

- Bootcamp or use virtual machine (Oracle VM Virtualbox, Parallels, etc.) •

Remote Desktop

  http://be.uw.edu/spaces/computing/software-application-server/

- Work on desktops on campus with ArcGIS installed (Gould Hall and Suzzallo Library);

Student Assessments

Lab Assignments (70%) There will be 9 assignments total (1/week) each worth 10-15 points, *due 1 week after they are assigned* and turned in via Canvas (11:59pm (PT) on the due date). Late submissions will be deducted 10%/day including weekends; submissions turned in later than 1- week past due date will not be accepted, except under extreme circumstances. Feel free to discuss assignments in groups, but YOU MUST SUBMIT YOUR OWN ORIGINAL WORK (i.e., text, maps) for credit. *No group submissions are permitted.*

Final Exam (30%) There will be a cumulative final exam covering lecture material, readings, and skills from the lab sessions.

Disability Resources If you have already established accommodations with Disability Resources for Students (DRS), please communicate your approved accommodations to me at your earliest convenience so we can discuss your needs in this course. If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (conditions include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 206- 543-8924 or uwdrs@uw.edu or disability.uw.edu. DRS offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law.

Academic Integrity All students are expected to do their own work, and all work submitted for credit must be individual, although students are allowed to work together on labs. Direct quotations of other work should be enclosed with quotation marks with a citation afterward. When you rely substantially on another person's work without quoting from it directly, please use in text citations at the end of an appropriate section.

Religious Accommodations Policy: Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at Religious Accommodations Policy (https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/). Accommodations must be requested within the first two weeks of this course using the Religious Accommodations Request form (https://registrar.washington.edu/students/religious accommodations-request/)."

Course Schedule

Week	MONDAY Lectures	TU	WEDNEDAY Labs	TH	FRIDAY Labs
0			30 LEC 0: Introduction & Overview of GIS		02 LAB 0: Introduction & Overview of GIS
1	05 LEC 1: Data Models, Attributes, ArcCatalog		07 LAB 1: ArcGIS Basics		09 LAB 1: ArcGIS Basics
2	12 LEC 2: Tables, Queries, Joins, Data Classification		14 *Wed LAB 1 DUE* LAB 2: Attribute Data		16 *Fri LAB 1 DUE* LAB 2: Attribute Data
3	19 LEC 3: Coordinates, Projections, Datum		21 *Wed LAB 2 DUE* LAB 3: Coordinate Systems, Projections		23 *Fri LAB 2 DUE* LAB 3: Coordinate Systems, Projections
4	26 Equity Week LEC 4: Lab Cartography Practice		28 *Wed LAB 3 DUE* LAB 4: Cartography Bonus LAB: Geospatial Analysis (due Dec 18th)		30 *Fri LAB 3 DUE* LAB 4: Cartography Bonus LAB: Geospatial Analysis (due Dec 18th)
5	02 LEC 5: Data Sources, Meta-Data, Data Quality		04 *Wed LAB 4 DUE* LAB 5: Data Sources, Creating Data		06 *Fri LAB 4 DUE* LAB 5: Data Sources, Creating Data
6	09 LEC 6: Vector Analysis		_11_ _Veterans Day_ _(NO CLASS)_		13 * Wed/Fri: LAB 5 DUE* LAB 6: Vector Analysis *** on your own time
7	16 LEC 7: Raster Analysis		18 *Wed LAB 6 DUE* LAB 7: Raster Analysis		20 *Fri LAB 6 DUE* LAB 7: Raster Analysis
8	23 LEC 8: Model		25 LAB 8: Model Building *** on your own time		_27_ *Wed/Fri: LAB 7 DUE* _THANKSGIVING HOLIDAY_ _(NO CLASS)_

	Building				
9	30 LEC 9: Geocoding, Georeferencing		02 *Wed LAB 8 DUE* LAB 9: Geocoding		04 *Fri LAB 8 DUE* LAB 9: Geocoding
10	07 LEC 10: Review		09 *Wed LAB 9 DUE* Final Exam		11 *Fri LAB 9 DUE* Final Exam
Finals	14 *(NO CLASS)*		16 *(NO CLASS)*		18 *Bonus LAB DUE* *(NO CLASS)*