

ISMT E-150: Introduction to GIS (12917) - Fall 2018

(Last update: Friday, September 28, 2018)

Course lecture time: Tuesdays 7:40p.m. – 9:40p.m. Eastern Time

Course format: Live video conference

Location (website): <https://canvas.harvard.edu/courses/52974>

Optional online help sections: Thursdays, 8:00 – 9:00 p.m.

Instructor: Mr. Jeff Blossom jblossom@cga.harvard.edu

Teaching Fellow: Mr. Giovanni Zambotti, gzambotti@cga.harvard.edu

Prerequisite: Familiarity with Microsoft Office Suite (Word, Excel, PowerPoint), online learning platform (Zoom) and Internet browsing

Credits: 4

Course Description

This course introduces the concepts and components of a geographic information system (GIS). It also teaches the essential skills of operating a functional GIS through the use of ArcGIS software package. By completing this course, students will understand the operational processes of spatial data acquisition, editing and QA/QC, metadata development, geodatabase design, spatial query and display, spatial analysis and modeling, preliminary GIS application development, cartographic mapping and dynamic visualization, and GIS implementation basics. Students will also be exposed to Google Earth and common open source GIS tools, as well as the basic concepts of remote sensing and Global Positioning System (GPS).

GIS technology has broad applications in natural and social sciences, humanities, environmental studies, engineering, and management. Examples include wildlife habitat study, urban and regional planning, contagious disease monitoring, agriculture and forestry, environmental quality assessment, emergency management, transportation planning, consumer and competitor analysis, and many more. This course will introduce a few selected cases of GIS application in different disciplines.

Textbook

Required: **Getting to Know ArcGIS** (4th Edition)

Authors: Michael Law, Amy Collins

Publisher: ESRI Press (July 2015, © 2015)

ISBN-13: 978-1589483828; ISBN-10: 1589483820

<http://esripress.esri.com/display/index.cfm?fuseaction=display&websiteID=286&moduleID=0>

<http://www.amazon.com/Getting-Know-ArcGIS-Michael-Law/dp/1589483820>

e-book: https://www.amazon.com/Getting-Know-ArcGIS-Michael-Law-ebook/dp/B01DK3SWO4/ref=sr_1_1?s=digital-text&ie=UTF8&qid=1536059933&sr=1-1&keywords=Getting+to+Know+ArcGIS

Recommended: **Geographic Information Systems and Science** (4th Edition)

Authors: Paul A. Longley, Michael F. Goodchild, David J. Maguire, David W. Rhind

Publisher: Wiley (March 2015, ©2016)

ISBN-13: 978-1118676950; ISBN-10: 1118676955

<http://www.wiley.com/WileyCDA/WileyTitle/productCd-EHEP003247.html>

<http://www.amazon.com/Geographic-Information-Science-Systems-Longley/dp/1118676955/>

Course Schedule

Week	Date	Lecture	Demo	Lab Assignment	<i>Getting to Know...</i> Chapters	<i>GIS&S</i> Chapters	Guest Lecturer
1	9/4/2018	Lecture 1: Introduction, course overview, what is GIS	Demo 1: ArcGIS navigation, online help	Lab 1: ArcGIS basics, loading data, scales, navigation, online help	1, 2, 3, 4	1, 2	
2	9/11/2018	Lecture 2: Cartographic principles and conventions	Demo 2: Map symbology customization	Lab 2: Making maps	7, 9, 10	3, 12	
3	9/18/2018	Lecture 3: Cartography continued.	Demo 3: Joining spatial and tabular records, projection definition and conversion	Lab 3: Attribute query, joining and relating, projection	6, 15, 17	5, 8	
4	9/25/2018	Lecture 4: Spatial data properties and management	Demo 4: Vector data editing, geocoding	Lab 4: Create feature classes, vector data editing, geocoding	11, 12, 13, 14	10	
5	10/2/2018	Lecture 5: Vector based spatial analysis	Demo 5: Different overlay analyses	Lab 5: Location query, overlay and adjacency analyses	8, 16, 18, 19	14	
6	10/9/2018	Lecture 6: Raster based spatial analysis	Demo 6: Georeferencing	Lab 6: Map algebra, surface analysis, raster-vector conversion, geo-referencing	Supplementary 6A-6C	15	
7	10/16/2018	Lecture 7: Spatial statistics and geo-statistics	Demo 7: Interpolation comparison	Lab 7: Spatial dependency, clustering, fragmentation, interpolation	Supplementary 7A-7C	4, 6	Josh Lieberman
8	10/23/2018	Mid Term Exam	Final project requirements, details, and sample projects	Planning for final project			
9	10/30/2018	Lecture 8: Data collection, data quality, and GPS	Demo 8: Internet data searching, topology editing	Lab 8: Explore final project ideas, initial data collection.			
10	11/6/2018	Lecture 9: Introduction to Remote Sensing. GIS modelling.	Demo 9: Model Builder	Lab 9: test, select and document analytical methods for final project. <i>Project proposal due (500-1000 words)</i>		9	Magaly Koch
11	11/13/2018	Lecture 10: Web GIS and open source GIS (recorded, no live meeting)	Demo 10: WebGIS	Lab 10: conduct analysis, explore visualization options			
12	11/20/2018	Lecture 11: GIS modelling, automation, and animation. (recorded, no live meeting)	Demo 11: Multi-band image composition	Lab 11: <i>Data evaluation report due (500-1000 words). prepare final project presentation (PowerPoint, PDF or other visual aid, 8-10 minutes)</i>	5, 20, Appendix A	7, 11, 13, 16	
13	11/27/2018	Lecture 12: Introduction to Global Positioning Systems	Demo 12: Creating spatial features from GPS data	Lab 12: compose final project poster (42" x 36" in size, PDF file, < 350 words of descriptive text)			
14	12/4/2018	Lecture 13: Geospatial applications and perspectives	Demo 13: ArcGIS Online, WorldMap	Lab 13: compose final project poster (42" x 36" in size, PDF file, < 350 words of descriptive text)			
15, 16	12/11, 12/18	Project Oral Presentation					

Grading

Activity	Description	Weight	Due Date
Class Participation (13%)	Attend 13 lectures (weeks 1-7 and 9-14), participate in class discussion	13%	Every Tuesday, 7:40 - 9:40pm
Lab Assignments (35%)	7 labs, 5% each (teaching fellow grade)	35%	Next Friday midnight
Mid-term Exam (20%)	in class, 1.5 hr, open book (teaching fellow grade)	20%	8th week, Tuesday 7:40-9:40pm
Final Project (32%)	written proposal (instructor grade)	5%	10th week Sunday
	written data evaluation report (instructor grade)	5%	12th week, Sunday
	in class oral presentation 14%	instructor grade	Last 2 weeks, (12/11, 12/18) 7:40-9:40pm
		teaching fellow grade	
	final project poster (instructor grade)	8%	Last week, Friday (12/21)
Total		100%	

Notes

- Each class session will be recorded and posted on the course website for future viewing.
- Always sign in to each class session with your name matching that on the class registrar. Using nick names may lead to an error in logging your attendance record.
- Always type something in the chat window as soon as you login, and right before you logoff. It could be as simple as “Hi” when you login, and “Bye” when you logout. This is used as your attendance record. If you don’t enter anything in chat, we will have no record proving that you were present for the lecture once you logoff, and you may lose one point per lecture.
- Whenever you step away from the virtual classroom without logging off, please indicate so with the “status” tool.
- Assignment dropboxes will be closed past deadline. Please submit your late assignments as email attachment to both the TF and Instructor.
- For all assignments submitted past due date, there will be a 10% deduction per day on the score. This means that if you are one day late you will get 90% of your score. Two days late is 80% and so on. If it is late for more than 10 days, you won't get any points, but you may still submit it for the purpose of getting feedback from the TA or me.
- Each student has one chance to apply for an “excused absence” from attending a live lecture. For an excused absence you will not lose the 1% grade point for missing a live online lecture by providing a legitimate reason. If asking for an excused absence, email both the Instructor and TF with your request. If you miss more than one lecture, there will not

be any further chance to waive the point deduction regardless of the reason. This is to be fair to all students, some have to get up before 5am or stay past midnight to attend live lectures, and to be truthful to your own learning experience too, watching a recording is not the same as watching live and participating in live classroom discussions.

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