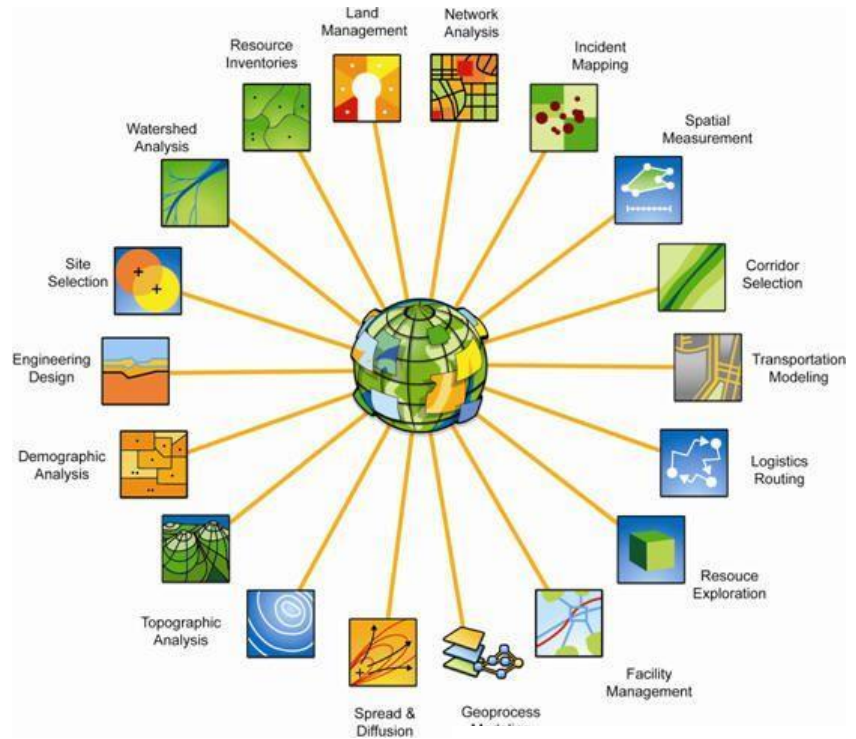**DCS 2335/ENVS 2004/URBS 2004**
Understanding Place: GIS and Remote Sensing
Fall 2021

Source: Directions Magazine

Description:
Geographic Information Science (GIS) is a dynamic field that is increasingly a critical dimension of understanding the interactions between humans and their environment. GIS uses computer-based systems for storing, organizing, analyzing and visualizing geographic data. Remote Sensing technologies such as LANDSAT satellite imagery or LiDAR (**Li**ght **D**etection and **R**anging) are used for everything from analyzing land use change to modeling the effects of climate change. The combination of GIS and Remote Sensing provides us with the tools to both investigate the spatial dimensions of environmental questions and effectively communicate science to the general public.

Course Goals are for you to:

Understand the fundamentals of GIS and Remote sensing:
- Understand the spatial dimensions of real world questions,
- Explore GIS and Remote Sensing as tools for research and problem solving,
- Develop a working knowledge of GIS and Remote Sensing terms.
- Learn about emerging trends in GIS and Remote Sensing.

Become proficient in use of GIS software to complete a spatial analysis**:**
- Identify sources of spatial data including the creation and collection of GIS data,
- Gain proficiency in working with various formats of spatial data include raster, vector, las, satellite data,
- Understand the role of coordinates systems and projections in working with spatial data,
- Develop mastery of ArcGIS software to explore the spatial dimensions for a range of applications with a particular emphasis on natural and physical science applications,
- Explore Remote Sensing data and technologies.

Become critical consumers of spatial data:
- Examine the equity dimensions of spatial analysis
- Explore how cartographic analysis and presentation of data can influence public understanding of data,
- Understand the role of scale, resolution, and data source in influencing accuracy of a spatial analysis

Course format:
- ***Meeting times*** – Tuesdays and Thursdays 8:30-9:55. Class meeting times will include both a lecture component and a hands-on lab exercise. Generally, I will lecture on Tuesdays, reviewing material covered in the tutorials and labs. On Thursdays we will work on labs based upon the tutorials.

- *Office Hours/Help sessions* – Office Hours are a time for you to meet with me about questions on an assignment, to review any material that we have covered in class, or to start to discuss your final project. Office hours are set up to allow two students to meet at one time.   You can reserve both slots if you would prefer to meet one on one. The slots are for 15 minutes each, but you can reserve as many time slots as you think you will need to discuss your questions. I will set up help session times based upon times that work best for students in the class. Students can schedule through the Help Session link on Blackboard. I am available to meet in person in my office in and via Zoom. Please be sure to indicate which way you prefer to meet.

Active Learning:
I have found over the years that the best way for students to become proficient at GIS is to keep practicing. Generally, working with a particular spatial technique requires repeating it 4 times:
- **Learn** a spatial analysis technique (introduced in the *tutorial*),
- **Apply** it to a real world problem (*lab exercises*),
- **Connect** the technique to other spatial analyses techniques (*exam*), and
- **Integrate** multiple techniques to answer a spatial question (*final project*).

To do well, students should not shortchange any of these steps. The good news is that if you have taken the time to do the tutorials and lab exercises, this will allow you to be more creative in carrying out the spatial analysis for your final project, and you will have much more fun with both the take home exam and final project.

Textbook: The textbook is available through the library as an e-book. Please note that only one student can access the text at a time, so be sure to check it back in once you have finished using it.

Price, Marybeth. Mastering ArcGIS Pro. 1st edition. 2019. McGraw Hill 605 pages. Note there is a ebook available through the library but only one person can access the ebook at a time. There is also a copy of the textbook on reserve in the Hatch Library.

Readings. These are intended to supplement the course tutorial chapter readings and help you become more critical consumers of spatial data. I will share these on blackboard

Software
We will be using ArcGIS Pro 2.7.

Assignments. Assignments can be found both in the Modules and in the Assignments section of blackboard. Please post all assignments to blackboard

Assignment	Description	Percent
Participation	Participation includes active participation in Zoom class discussions and breakout sessions synchronous), and discussion boards (asynchronous).To contribute most effectively to our learning community, you are expected to attend all synchronous class meetings. Over the course of the semester, we will discuss course readings in class and work in teams to problem solve lab assignments in our synchronous class sessions. I will record class meetings if you are not able to attend all of them. Asynchronous assignments include contributing to blackboard discussion board prompts and providing thoughtful feedback to your colleagues' work.	10%
Tutorial exercises/ Discussion Board Postings	Each student is expected to complete assigned tutorial chapters from Mastering ArcGIS by Price outside of class. You are expected to read and be responsible for the material covered in the chapter as well. Lab assignments will be based upon the material covered in these exercises. The tutorials must be completed prior to the class the tutorial is assigned. I will post an assignment for you to respond to upon completing the	10%

	tutorial. For some tutorial assignments, you will be posting to a discussion board and responding to two of your colleagues. There are 9-10 tutorials that you will complete **Post Tutorial Assignments to Blackboard Assignments/Discussion Boards unless otherwise indicated.**	
Lab assignments	As mentioned above, the lab assignments build upon material introduced in the tutorials from <u>Mastering ArcGIS</u>. You will work on these lab assignments individually during class and outside of class as needed. The lab assignments are designed to apply what you are learning in the tutorials, gain additional experience in a range of spatial analyses and remote sensing technologies, and provide you with skills needed to successfully complete your semester project. There will be 5 lab assignments **Post Lab Assignments to Blackboard (Assignments) unless otherwise indicated.**	30%
Exam	There will be a take home exam. The exam is designed to be a practical exam to test your knowledge of GIS and prepare you for your final project. There is no final exam in this class.	10%
Final Project Worth a total of 40%	Final Project Components include the following components. I will post more detailed information on each component on blackboard	
	Project proposal and data set. A 3-4-page description of your project which includes data requirements and analysis to complete the project. The proposal should develop an analysis based upon what you have learned in class and include a summary of three articles from the literature that inform your research project. Include data you have collected or created to date. Students will submit a *Draft Proposal* and a *Peer Review of Draft Proposal* as part of this grade.	5 %
	Initial Visualization and Peer Review of Initial Visualization. Student will submit an initial visual and provide feedback on two of your peers' visualizations	5 %
	Peer Review of Draft. Students will submit a draft version of the final paper/draft story map. Each student will provide feedback on one peer's draft final project.	5 %
	For your final project, you can select one of the following ● **Story Map**– An online web map of your project analysis. ● **Final project paper** – A paper in the format of a final term paper that summarizes findings and includes visuals of your results.	20 %
	Data Product: A map package of your project. ArcGIS Pro project folder with includes final geodatabase, ArcGIS Pro project (apx), and map package<u>.</u>	5%
Total		**100 %**

Late Assignment Policy: Over the course of the semester, students may encounter a number of challenges (technology, illness). To respect these challenges, I have a policy that each student has 5 late passes for the semester. This allows you to hand in an assignment up to 5 days late or hand in any one assignment 1 or more days late for a total of 5 days over the course of the semester. You do not need to share why you are using a late pass with me- just let me know when you want to use one or more of the passes that are available. These can be used for tutorials and labs, but not for the final project deadline. Once students have used up the late passes, late assignments will be deducted 5 points for the first 24 hours and a total of 10 points after that. There is not a late penalty for tutorials, but as we'll be covering materials in labs that are introduced in tutorials, so you'll want to try and get through as much of the content in the tutorial as possible by the due date.

How to get the most out of the class
- **Read the assigned chapters in the Price textbook and complete tutorials.** Tutorials should take about two hours to complete (you may find that it goes more quickly over the course of the semester). You can decide how important it is to your learning to complete the tutorials comprehensively (completing every step). You'll notice that tutorials do not represent a large component of your final grade. But for

students who want to have a solid foundation and be able to apply this in an academic or job setting, completing the tutorials will enhance your learning. It will also help you engage with the labs and class discussions.

- **Attend class and participate actively and be prepared for class work**. This is the best way you can get the most out of class. Your grade includes attendance and active participation during class sessions. Participation includes engaging in small group and class discussions, listening to lectures and class demonstrations, and collaborating with your classmates in breakout rooms. Be prepared to work on lab assignments in our breakout rooms. Please leave your video on in class. If for some reason you are not able to leave your video on, please communicate that to me in advance of class.
- **Complete lab assignment and final project components**. As much as possible try to complete lab assignments on time. This will make class periods more meaningful for you. Again, you have assignment passes to use as needed. The lab assignments and final projects are developed to help you understand how to develop a spatial question, find data, complete an analysis and create compelling visuals. These assignments also provide opportunities for you to work collaboratively and learn from your peers. This will help you learn how to continue to apply spatial analysis to future opportunities.
- **Sign up for office hours**. Office hours allow me to meet you where you are in your learning during the semester and to get to know each of you better. You can sign up via the blackboard link. Students who meet with me for office hours sessions generally do better in the class.

I have charted out the time requirements for completing each component of the class to respect the general guidelines of a Bowdoin course equivalent to approximately 12 hours per week including our in class meetings and some office hour meetings.   Please communicate to me if you feel that certain assignments are taking longer than you had anticipated.

I greatly value your detailed feedback on what contributed to your learning in this class and how I can improve it for the students who will follow you. Please fill out BCQs for this course. Your responses are completely anonymous, and I will not have access to them until after grades are submitted

Grading policy: Grading and Late Assignments. For the final grade, I will convert numerical grades to letter grades according to the following system: 94-100=A, 0-93=A- 87-89=B+, 83-86=B, 80-82=B-, 77-79=C+, 73-76=C, 70-72=C- 60-69=D, 60 and below=F