

Course Information, Spring 2022

Instructors:

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Teaching Assistants:

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Office Hours:

Rahimzadeh: Due to the pandemic please make an appointment by email (office#215 Nutting Hall)
 Guay: Due to the pandemic please make an appointment by email.
 TAs: Due to the pandemic please make an appointment by email.

Class meetings: Lectures are Tuesdays and Thursdays at 12:30-1:45 pm in Williams Hall 140. **In the first two weeks of the semester, lectures will be online through Zoom (link provided in the sent Google Calendar invite) due to possible omicron surge.**

Lab are in-person from the start and lab hours are Fridays 9:00 am-11:50 am, 2:00 pm-4:50 pm and Mondays 2:00 pm-4:50 pm in Nutting 235 as enrolled.

1. Prerequisites: MAT 116, MAT 122 or a passing score on UM Math Placement Exam #3. Students should also have experience working with Microsoft Windows. Ability to use spreadsheets such as Excel, elementary algebra, and general knowledge of statistics are helpful. Students will be expected to spend additional time in the lab to complete lab activities and manage independent projects as needed.

2. Course Description: Students will build an understanding of the fundamentals and applications of GIS through lecture, readings, lab assignments and completing a final practicum (undergraduate students) or final project (graduate students). Students will learn to use ArcGIS software for doing lab activities and assignments using existing data. This computer-intensive course includes a detailed discussion and related computer activities on the following topics: basic geography and map and GIS concepts, data sources, data quality, data classification, vector and raster data models, projections, datums, coordinates, geoprocessing and spatial analysis. 4 credits.

3. Learning Outcomes: Upon completion of this course, students will have competence in GIS concepts and applications in general and will have demonstrated ability to collect, manipulate and analyze spatial data for specific purposes. Specifically students will be able to:

- create maps that effectively convey information and evaluate existing maps design and effectiveness
- design a cartographic model using vector-based spatial analysis
- proficiently use ArcGIS software for mapping/making queries/geoprocessing and modeling
- understand projections, coordinate systems and georeferencing
- learn about raster data and their sources and an introduction to spatial analysis
- plan and implement a GIS project based on a real-life problem using available or collected data.

4. Methodology: This course teaches students the fundamentals of GIS and its applications using the ArcGIS software, an industry standard, as a platform. The course includes lab exercises, lectures, activities, assignments, and discussions intended to provide students with the knowledge, skills, and perspectives they need to understand and use GIS technology.

5. Activities and Assignments: Late assignments, without PRIOR arrangement with the instructor, will receive a reduced grade. No credit will be given to assignments turned in after assignments are graded and returned.

- Lab Assignments: There will be five lab assignments as detailed in the course syllabus. Due dates for lab assignments are provided. Assignments must be submitted through the class portal on Google Classroom. Paper submissions are not acceptable.
- One exam (Mid-term Exam) is planned for the course as specified in the course syllabus. The rest of the content will be evaluated through bi-weekly quizzes as indicated in the syllabus.
- Final practicum: Students will have their final practical exam on the last two weeks of the class and need to complete and submit the maps/answers by the end of the lab hours (Friday or Monday) on the same day. The practical exam will cover topics practiced in labs and students can use their lab instructions. Instructors/TAs will provide guidance and help troubleshoot during the exam if needed.
- For graduate students only: Final Project: By mid-term, students will have identified a final project based on what they have learned to address a real-life problem with the consultation of the instructor. The topic must be first approved by the instructor to ensure feasibility and appropriateness of the work load. The topic can be related to a graduate thesis, employer need, faculty member's research, etc. that can be addressed with GIS. The final project will be submitted through the class portal on Google Classroom in the form of a digital poster (PDF) that includes, problem statement, methods and the product. Details will be shared later during the semester. The project map package must be created but does not have to be submitted. The instructors will check the progress and your final map documents over the last two weeks of the semester.
- Presentation: Each student will create a 7 minute presentation of an interesting application of GIS in their major (5 minutes of presentation followed by 2 minutes Q&A) and deliver that presentation as scheduled in the syllabus. This will have 5% of the total grade.
- Final Project Presentation (graduate students): Each graduate student will create a 5 minute presentation of their final project topic and deliver that presentation as scheduled in the syllabus. This will have 5% of the total grade.

6. Attendance and Class Participation Policy: Attendance and class participation are expected of all students at all times unless special circumstances warrant otherwise. If you miss more than three lectures over the course of the semester without permission, you won't receive the attendance credit. Labs are

mandatory. Please do your best to attend all labs. It will be hard to catch up if you miss labs. Any predictable absence from labs must be requested prior to the lab.

7. Evaluation: Grades will be calculated as follows:

- a) Attendance & Participation (10%)
- b) Weekly quizzes (10%) every Thursday preceded by a quick review.
- c) Mid-term Exam (20%): There will be a review session before the mid-term exam. See class syllabus for details.
- d) Laboratory Assignments (35%): Students will be assigned five assignments; these will be the outputs of five of the lab exercises during the semester.
- e) Final practicum and Presentation (25%): The grade for the final practicum/project (20%) will be assessed based on data modeling and management, cartographic quality of maps or digital map products, completeness of documentation, and applicability to the problem being addressed. 5% is reserved for project topic, proposal submission and presentation as outlined in Section 5 above.

8. Grading Rubric:

	-		+
A	90-92	93-100	-
B	80-82	83-87	88-89
C	70-72	73-77	78-79
D	60-62	63-67	68-69
F		<60	

9. Textbook and readings:

- Mastering ArcGIS, M. H. Price., McGraw-Hill Education, ISBN 978-0078095146, 2016, 7th Edition or later (8th, 2018). Parts of Chapters 1, 3, 4, 5 and 10 will be provided through Google Classroom. Purchasing the book is recommended but is optional.
- Essentials of Geographic Information Systems by Jonathan Campbell and Michael Shin, 2011 ISBN 13: 978-1-4533219-6-6; Saylor Foundation. This book is free and can be accessed here: <https://open.umn.edu/opentextbooks/textbooks/67>
- ArcGIS Desktop 10.8 Help (free online) <http://desktop.arcgis.com/en/arcmap/>
- Additional readings, as assigned

10. Course Schedule Disclaimer (Disruption Clause):

In the event of an extended disruption of normal classroom activities (due to COVID-19 or other long-term disruptions), the format for this course may be modified to enable its completion within its programmed time frame. In that event, you will be provided an addendum to the syllabus that will supersede this version.

11. Disability statement: If you have a disability for which you may be requesting an accommodation, please contact Student Accessibility Services, 121 East Annex, 581.2319, as early as possible in the term. Students who have already been approved for accommodations by SAS and have a current accommodation letter should meet with me (the instructor of the course) privately as soon as possible.

12. Academic dishonesty: Academic honesty is very important. It is dishonest to cheat on exams, to copy term papers, to submit papers/assignments written by another person, to fake experimental results, or to copy or reword parts of books or articles into your own papers/assignments without appropriately citing the source. Students committing or aiding in any of these violations may be given failing grades for an assignment or for an entire course, at the discretion of the instructor. In addition to any academic action taken by an instructor, these violations are also subject to action under the University of Maine Student

Conduct Code. The maximum possible sanction under the student conduct code is dismissal from the University.

13. Sexual Violence Policy:

Sexual discrimination reporting: The University of Maine is committed to making campus a safe place for students. Because of this commitment, if you tell any of your teachers about sexual discrimination involving members of the campus, your teacher is required to report this information to the campus Office of Sexual Assault & Violence Prevention or the Office of Equal Opportunity.

Behaviors that can be “sexual discrimination” include sexual assault, sexual harassment, stalking, relationship abuse (dating violence and domestic violence), sexual misconduct, and gender discrimination. Therefore, all of these behaviors must be reported.

Why do teachers have to report sexual discrimination? The university can better support students in trouble if we know about what is happening. Reporting also helps us to identify patterns that might arise—for example, if more than one victim reports having been assaulted or harassed by the same individual.

What will happen to a student if a teacher reports? An employee from the Office of Sexual Assault & Violence Prevention or the Office of Equal Opportunity will reach out to you and offer support, resources, and information. You will be invited to meet with the employee to discuss the situation and the various options available to you.

If you have requested confidentiality, the University will weigh your request that no action be taken against the institution’s obligation to provide a safe, nondiscriminatory environment for all students. If the University determines that it can maintain confidentiality, you must understand that the institution’s ability to meaningfully investigate the incident and pursue disciplinary action, if warranted, may be limited. There are times when the University may not be able to honor a request for confidentiality because doing so would pose a risk to its ability to provide a safe, nondiscriminatory environment for everyone. If the University determines that it cannot maintain confidentiality, the University will advise you, prior to starting an investigation and, to the extent possible, will share information only with those responsible for handling the institution’s response.

The University is committed to the well-being of all students and will take steps to protect all involved from retaliation or harm.

If you want to talk in confidence to someone about an experience of sexual discrimination, please contact these resources:

For confidential resources on campus: Counseling Center: 207-581-1392 or Cutler Health Center: at 207-581-4000.

For confidential resources off campus: Rape Response Services: 1-800-310-0000 or Spruce Run: 1-800-863-9909.

Other resources: The resources listed below can offer support but may have to report the incident to others who can help:

For support services on campus: Office of Sexual Assault & Violence Prevention: 207-5811406, Office of Community Standards: 207-581-1409, University of Maine Police: 207-581-4040 or 911. Or see the OSVP website for a complete list of services at <http://www.umaine.edu/osavp/>

14. University of Maine COVID-19 Syllabus Statement

COVID-19 is an infectious disease caused by the coronavirus SARS-CoV-2. The virus is transmitted person-to-person through respiratory droplets that are expelled when breathing, talking, eating, coughing, or sneezing. Additionally, the virus is stable on surfaces and can be transmitted when someone touches a contaminated surface and transfers the virus to their nose or mouth. When someone becomes infected with COVID-19 they may either have no symptoms or symptoms that range from mild to severe and can even be fatal. During this global pandemic, it is imperative that all students, faculty, and staff abide by the safety protocols and guidelines set forth by the University to ensure the safety of our campus. All students are encouraged to make the Black Bear Cares Pact to protect the health of themselves, the health of others, and the College of Our Hearts Always.

Black Bears Care Pact: <https://umaine.edu/return/black-bears-care/>

Symptom checking: The symptoms of COVID-19 can range from mild to severe, and even people with mild symptoms may transmit the virus to others. Students are encouraged to use the symptom checking app each day before attending class or moving about campus and follow the recommendation prompted within the app. Students should monitor for the following symptoms daily: fever (temperature >100.4F/38.0C) or chills, new cough, loss of taste or smell, shortness of breath/difficult breathing, sore throat, diarrhea, nausea, or vomiting, or the onset of new, otherwise unexplained symptoms such as headache, muscle or body aches, fatigue, or congestion/runny nose.

Physical distancing: Students need to make every effort to maintain physical distancing (6 feet or more) indoors and outdoors including within classrooms. The University classrooms and physical spaces have been arranged to maximize physical distancing. Follow the traffic patterns outlined in each building and outdoor space to avoid crowding. If students are in an academic setting (i.e. clinical or lab class) that requires them to reduce physical distancing, they should follow the instructor's guidelines.

Face coverings: Students must wear appropriate face coverings in the classroom. Face coverings must be worn in indoor and outdoor spaces on campus unless people are alone in a room with a door closed or when they are properly physically distanced and do not expect someone to approach them. When face coverings are removed people are placing themselves and those surrounding them at increased risk for COVID-19.

Eating and drinking in classrooms: Students may not eat or drink in the classrooms and are encouraged to take their food or drink into areas designated for these purposes where they can maintain 6 feet physical distance from others.

Hand hygiene: Proper hand hygiene is an effective measure to prevent the spread of COVID-19. Students should wash their hands often with soap and water or use a hand sanitizer with at least 60% alcohol, especially after using the bathroom, before eating or drinking, and before and after going to class or university spaces such as the recreation center, library, or dining halls.

Contingency plans: Classes will be held in various formats to offer flexibility, compassion, and empathy during these unprecedented times. Under certain circumstances, students or instructors may need to miss classes or in-person classes may be disrupted. Students are expected to notify their instructor if they are unable to attend an in-person or online class but will not be penalized for missing class due to illness or the need to care for a family member affected by COVID-19. If a disruption occurs, your instructor will provide communication and contingency plans.

What to do if you have or suspect you have COVID-19: If you have symptoms of COVID-19 or have been possibly exposed to someone with COVID-19, you should stay home, not interact with others, and

contact your health care provider immediately to be tested for COVID-19. You may not attend in-person classes and should suspend interactions with others until you are tested. Prior to receiving test results you should quarantine in your living area according to the Maine CDC guidelines below. Please follow the guidance of your health care professional regarding testing, quarantine, and isolation during the testing process and potential illness period.

What to do if someone you know has or may have COVID-19: If someone you know or that you have had close contact with (defined by the ME CDC as 15 mins or more within 6 feet or less) has tested positive for COVID-19, you should stay home and quarantine according to the guidance of the ME CDC, contact your health care provider, and continue to monitor for symptoms. You may be required to quarantine and/or be tested for COVID-19 under these circumstances. You may also have been exposed to COVID-19 by someone you do not know, and it is possible that you could be contacted through contact tracing to determine if you were exposed. Everyone should respond to these confidential questions to ensure the safety of themselves and those around them.

Maine CDC guidelines: <https://www.maine.gov/dhhs/mecdc/infectious-disease/epi/airborne/coronavirus/general-information.shtml>

If you have questions or would like additional information related to the University of Maine COVID-19-specific policies or procedures please use the following sources:

University Webpages: umaine.edu/return and together.maine.edu

COVID-19 Information line: 207.581.2681

Emergency Operations Center Email Contact: umaine.alerts@maine.edu

Additional important notes:

- You should plan to spend **at least 5 hours per week** on you GIS work otherwise it will be easy to fall behind and it will be difficult to catch up.
- You will need to have a flash drive with at least 2GB of memory to save your lab materials on. Make sure you copy your data from the lab computer onto your flash drive or Google Drive.
- It will take time to learn how to use the software. ArcGIS is an industry standard for GIS and a very powerful software but you may need to be patient as sometimes the same job will have to be done in a different way. Advice will be provided by the instructors on how to troubleshoot. There are a lot of tools and functions, do not get frustrated if you cannot memorize everything; instead focus on what capabilities the software has and what it can offer you.
- Avoid getting stuck for several hours on a problem by communicating well with either the instructors or the TAs. You can always email or can stop by during office hours.
- Although you will have the last two weeks of the lab to do your final project (graduate students), it is highly recommended that you start working on your project at least a month earlier. As for all work depending on computers, technology might have unexpected issues causing significant delays in plans.
- Students are encouraged to compile a portfolio containing all lab assignments and final project outputs in the form of PDF files or paper printouts. This will be helpful for employment applications.

Course organization

	Date	Topic	Instructor	Reading	Assignment	Labs
Wk 1	Tue. Jan. 18	What is GIS? GIS concepts	Pari & Tony	Mastering ArcGIS, Ch. 1	Assignment 1 Part 1, due date Jan. 27, 11:59 pm	Lab 1: Fri. Jan. 21, Intro to ArcGIS, working with vector data
	Thr. Jan. 20					
Wk 2	Tue. Jan. 25	Intro to ArcGIS, map types, attributes types	Pari	Mastering ArcGIS, Ch. 4, Essentials , Chapter 2 , Section 1: Map Types	Assignment 1 Part 2, due date Feb. 3, 11:59 pm	Lab 1: Mon. Jan. 24, Intro to ArcGIS, working with vector data Lab 2: Fri. Jan 28, Symbolizing and classifying numeric data, making a map
	Thr. Jan. 27					
Wk 3	Tue. Feb. 1	Geographic coordinates and map projections	Tony	Mastering ArcGIS, Ch. 3, ArcGIS Help Projection Basics & The Geoid, Ellipsoid, etc, Essentials, Chapter 2.2 & 2.3	Assignment 2 Part 1, due date Feb. 14, 11:59 pm	Lab 2: Mon. Jan 31, Symbolizing and classifying numeric data, making a map Lab 3: Fri. Feb. 4 and): Geographic coordinates and map projections
	Thr. Feb. 3					
Wk 4	Tue. Feb. 8	Map design elements & principles; color in maps	Pari	Essentials, Chapter 9: Cartographic Principles	Assignment 2 Part 2, due date Feb. 17, 11:59 pm	Lab 3: Mon. Feb. 7, Geographic coordinates and map projections Lab 4: Fri. Feb. 11, Map design
	Thr. Feb. 10					
Wk 5	Tue. Feb. 15	Attribute data, mapping x-y coordinates	Pari	ArcGIS Help Tables and Attributes, Essentials, Chapter 6: Data Characteristics and Visualization ArcGIS Help: Using Select by Attributes, ArcGIS Help: Using Select by Location	Assignment 3 Part 1, due date Feb. 24, 11:59 pm	Lab 4: Mon. Feb. 14, Map design on. Lab 5: Fri. Feb. 18, Working with tables, Joins & relates
	Thr. Feb. 17	Queries: select by attributes; select by location, change projection				
Wk 6	Tue. Feb. 22	Continue wk 6	Tony	Mastering ArcGIS, Ch. 10, Essentials , Chapter 7: Geospatial Analysis I: Vector Operations	Assignment 3 Part 2, due date March 8, 11:59 pm	Lab 5: Mon. Feb. 21, Working with tables, Joins & relates
	Thr. Feb. 24	Map overlay and geoprocessing				
Wk 7	Tue. March 1	Vector analysis	Pari	ArcGIS Help Model		Lab 6: Mon. Feb. 28, Spatial

	Thr. March 3	GIS application		Builder Class handout		queries/attribute queries
Wk 8	Tue. March 8	Review	Pari & Tony		Assignment 4 Part 1, due date March 10 for Monday lab and March 22, 11:59 pm, for Friday labs	Lab 7: Geoprocessing
	Thr. March 10	Mid-term Exam				
Wk 9	Tue. March 15	Spring break	no class no class			no lab
	Thr. March 17					
Wk 10	Tue. March 22	Working with GPS Editing/creating features	Pari	Class handout	Assignment 4 Part 2, due date March 24 for Monday lab and March 29 for Friday labs, 11:59 pm	Lab 8: Making models
	Thr. March 24					
Wk 11	Tue. March 29	Raster and vector data model Raster analysis	Tony	Essentials, Chapter 4: Data Models for GIS Essentials, Chapter 8: Geospatial Analysis II: Raster Data, ArcGIS Help : Zonal statistics	Assignment 5 Part 1 and 2), due date March 31 For Monday lab and April 5 for Friday labs, 11:59 pm	Lab 9: Working with GPS
	Thr. March 31					
Wk 12	Tue. April 5	Raster analysis and ArcGIS online	Pari		Assignment 5 Part 2 and 2), due date April 7 For Monday lab and April 12 for Friday labs, 11:59 pm	Lab 10: Working with raster data, data conversion, surface analysis, zonal statistics, interacting with Google Earth
	Thr. April 7					
Wk 13	Tue. April 12	Lab review	Pari & Tony		Bonus assignment, due date: TBD	Lab 11: Review
	Thr. April 14	Intro to Lidar & point cloud processing				

Wk 14	Tue. April 19	Presentations via Zoom	Pari & Tony			Practical Exam 1 Mon. April 18 Fri. labs April 22
	Thr. April 21					
Wk 15	Tue. April 26	Presentations via Zoom	Pari & Tony			Practical Exam 2 Mon. April 25 Fri. labs April 29
	Thr. April 28					
Wk 16		Finals week	-----	-----	-----	-----