BI/GE 578: Marine Geographic Information Science

Instructor Name: Robin Francis
Office Location: BRB Rm 515
Office Hours: By appointment
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Course Dates: Nov. 27 – Dec. 20, 2023
Course Credits: 4
Teaching Fellow: Sophia Tigges
TF Contact: stigges@bu.edu

Classroom Location: CAS 141 C
Classroom Schedule: M-F 10:00 am – 5:00 pm
~50 min lunch about halfway through

Open hour lab access:
CAS 141 C is reserved for us 1 hour before class begins (9:00 am), so you may come in to class early to work.

Course Description
Marine Geographic Information Science is an introductory course on GIS principles, theories, and practices for marine environmental applications. We will focus on the fundamentals of marine GIS, spatial data, and spatial analysis by using real-world marine datasets using ESRI's latest ArcGIS software, ArcPro. Topics will include, but are not limited to, oceanographic data acquisition, habitat modeling, species distribution modeling, and marine spatial planning for conservation and human uses. There are no pre-requisites for this class, but computer proficiency is needed and basic understanding of statistics if helpful. The class will also host guest lecturers from the Marine GIS field.

Course Specific Learning Outcomes:
- Learn the fundamentals of marine GIS by using ArcGIS software
- Successfully use GIS tools to gain understanding of a marine science question
- Communicate your findings effectively through a formal presentation and scientific paper

Hub Learning Outcomes:
Please see "Marine Semester Hub Syllabus" as an appendix to the course syllabus for details. Summarized below:
- Scientific Inquiry II
- Oral & Signed Communication
- Creativity and Innovation
- Teamwork and Collaboration

Instructional Format, Course Pedagogy, and Approach to Learning
This course is a combination of lecture and lab assignments. Classes will consist of lectures, in-class exercises, and paper discussions, as well as open lab to work on lab assignments. You are expected to attend every class. You will also be required to complete lab assignments outside of class time if you do not finish them during lab time, as well as an independent hypothesis-driven geospatial research project.

Books and Other Course Materials

1. There will be no textbook required for this course. However, there will be readings required for discussion listed on the syllabus. These will be available in the class server folder.
2. Binder/Notebook dedicated to the labs and project, this will be used to record notes and steps of processes.

Overview Assignments and Grading

Grading:

2 Quizzes	20 %
Lab Assignments	30 %
Research Project	40 %
Participation and Attendance	10 %

No dropped quizzes or late work.

Lab Assignments: Each lab will state the requirements. These will be turned in via the 'Turn In' folder in your own 'Student Folder' in the Class Shared Files and graded by the course TF.

Research Project: Presentation (20%) and Paper (20%). Review the project handout for details and grading.

Resources/Support/How to Succeed in This Course:

1. Work together! The person sitting next to you has been, in my experience with this particular course, the most useful resource. You will have a more rewarding experience if you reciprocate.
2. Utilize your TF and ask for help. Sophia is an Earth & Environment PhD. candidate from the FitzGerald Lab and brings a whole new expertise to BUMP. They have TF'ed this course previously. They know!
3. If you need help outside of regular meetings, please make an appointment with Robin.
4. Accommodations for Students with Documented Disabilities: If you are a student with a disability or believe you might have a disability that requires accommodations, please contact the Office for Disability Services (ODS) at (617) 353-3658 or access@bu.edu to coordinate any reasonable accommodation requests. ODS is located at 19 Deerfield Street on the second floor (19 Buick Street).

Community of Learning: Class and University Policies

5. **Attendance & Absences.** This is an intense study of GIS and marine GIS principles that covers about two semesters worth of material in one month. You are expected to participate in classes 5 days a week with work that will remain out of class and for the weekend.

6. **Academic Conduct Statement** You need to read the CAS Academic Conduct Code, which you can find online at http://www.bu.edu/cas/students/undergrad-resources/code/. Academic misconduct involves not only direct cheating on quizzes, but more subtle acts as well. All work handed in for credit must be your own, with the exception that you may quote or paraphrase from other sources if you also cite the reference and page number. (It is not permissible, however, to use another student's work even if you cite that work.) For assigned homework and lab write-ups, take care not to work so closely with a classmate that some of your results or answers to questions are nearly identical. For example., your consultations with classmates should be limited to general discussions, not specific items such as "Show me how you answered question 2." We are required to report cases of suspected academic misconduct to the Dean's Office. Penalties for violations of the Academic Conduct Code may include suspensions or expulsions from the University.

Block Schedule

Date		Topics	Exercises	Lab Assignment	Due (At start of class)	Note	Readings – Due this day (am)
Week 1							
Day 1: **11/27** M		Introduction to GIS, MarineGIS, & ArcPro	Day1	Check-out computers / Class folder access / Practice moving data			
Day 2: **11/28** T		Basics I	1				
Day 3: **11/29** W		Basics II	2			Assign Vector 'Tools'	Reading Discussion 1
Day 4: **11/30** TH		Vector Tool exploration/ Finish Basics II	Finish 2	Lab 1 – Stellwagen Bank			Vector Tool Discussion
Day 5: **12/1** F		SPUE	3	Lab 1 – Stellwagen Bank			Reading Discussion 2
Week 2							
Day 6: **12/4** M		Projects Overview		Lab 2 – SPUE	**Lab 1**	**Quiz 1**	
Day 7: **12/5** T		Downloading SST Data	4	Lab 2 – SPUE			Reading Discussion 3
Day 8: **12/6** W		Raster Analysis	5	Lab 2 – SPUE		Assign Raster 'Tools'	Reading Discussion 4
Day 9: **12/7** TH		Habitat Modeling & Model Builder	6	Lab 3 – Habitat Modeling	**Lab 2**		Raster Tool Discussion
Day 10: **12/8** F		Projects Specifics/ Georeferencing & Historical Data	7	Lab 3 – Habitat Modeling			

Schedule subject to change
For readings and due dates: Due the morning they are listed on the syllabus

Date		Topics	Exercises	Lab Assignment	Due (At start of class)	Note	Readings – Due this day (am)
Week 3							
Day 11: **12/11** M		Spatial Autocorrelation/ Interpolation	8	Lab 3 – Habitat Modeling	**Project Proposal**	**Quiz 2**	
Day 12: **12/12** T		Marine Spatial Planning	9	Lab 4 – Marine Spatial Planning	**Lab 3**		Reading Discussion 5
Day 13: **12/13** W		Seafloor Mapping/ Downloading Bathymetry Data	10	Lab 4 – Marine Spatial Planning			Reading Discussion 6
Day 14: **12/14** TH		One-on-one Project Meetings	Work on your project	Lab catch up day / Work on Projects			
Day 15: **12/15** F		One-on-one Project Meetings	Work on your project	Work on Projects	**Lab 4**		
Week 4							
Day 16: **12/18** M		'How-To' Give a Good GIS Presentation	Work on your project	Work on Projects	**Abstract**		
Day 17: **12/19** T		Class Presentations	Work on your paper	Work on Projects			
Day 18: **12/20** W		Class Presentations	Work on your paper	Work on Projects	**Final Paper**	Due by midnight	

Schedule subject to change
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