FIRE: THE FIRST-YEAR INNOVATION & RESEARCH EXPERIENCE

SUSTAINABILITY ANALYTICS

FIRE Semester 3 (FIRE298)

Term: Fall 2024
Section: 0112
Professor: Thanicha Ruangmas
Pronouns: she/her/hers
Office: Symons 2209
Email: ruangmas@umd.edu
Office Hours: By appointment
Classroom: ATL2339
Class Meeting Time: Tue 11:00 am - 11:50 am

Research Setting: Symons 2207
Research Setting Hours:

Monday	11 am - 6 pm
Tuesday	1 pm - 6 pm
Wednesday	Lab closed
Thursday	10 am - 6 pm
Friday	10 am - 3 pm

Course Description

FIRE Semester 3 (FIRE298) is a 3-credit course that counts towards UMD's General Education - Scholarship In Practice requirement. In addition to those targeted outcomes, you can also expect to gain practical research knowledge and professional experience that is unique to your stream.

In this course, Sustainability Analytics students take ownership of their chosen research question and engage in a comprehensive research experience from start to finish. Their workflow includes writing a literature review, collecting and integrating data, visualizing data with plots and maps, testing hypotheses using causal inference and machine learning methods, and drawing conclusions. Toward the end of the semester, students showcase their results with posters and GitHub-Flavored Markdown pages, presenting them in class to Faculty Collaborators and at the FIRE Summit to a general audience.

Learning Outcomes

After successfully completing this course you will be able to:

1. Select and critically evaluate areas of scholarship.
2. Apply relevant research methods to produce a project in a manner that is authentic to the discipline.
3. Critique, revise, and refine projects.
4. Effectively communicate the application of scholarship through ancillary material.
5. Collaborate in order to bring about a successful outcome.
6. Build collaborative relationships representing diverse cultures, races, ages, genders, religions, lifestyles, and viewpoints.
7. Demonstrate proficiency in R programming language, specifically for querying, cleaning, combining, and modeling data.
8. Employ reproducible research workflow practices with Posit and GitHub.

9. Differentiate between predictive and inferential models used in data analytics and applied economics.
10. Present an environmental problem or public policy of the student's choice and explain its impact on the environment or different segments of society.
11. Effectively communicate research outcomes to audiences with varying levels of technical expertise.

Peer Research Mentors

Peer Research Mentors are experienced FIRE students who are experts on the stream's research and are dedicated to helping you.

Peer Research Mentor	Email Address
Landon Thomas	landonct@terpmail.umd.edu
Rygel Yance	ryance@terpmail.umd.edu
Defne Demireler	defned@terpmail.umd.edu

Required Resources

All course materials will be posted to ELMS.

Course Structure

Classroom sessions will train students in modeling, spatial data analysis, and communication skills essential for completing research projects. After the first two weeks of causal inference training, students will be assigned to teams based on their availability and interests. Each team member must meet with the Faculty Leader at the same time each week for a Lab Consultation to assess research progress and plan the following week's tasks. Research Deliverables from each team are due before their Lab Consultation.

FIRE Semester 3 will require approximately 6 hours per week in our research environment. In addition to the weekly Lab Consultations, each student should allocate around 5 hours each week to work on tasks agreed upon during the consultations. Students must submit a Progress Report detailing their contributions to the team project before each week's Lab Consultation. Weekly efforts will be graded based on the completion or effort put into the agreed-upon tasks.

Support

FIRE has developed guidelines and assembled resources to help support both your life as a student and your technological success in this course. For more information, please visit the FIRE Student Support page on our website.

Policies and Resources for Undergraduate Courses

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations
- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please visit www.ugst.umd.edu/courserelatedpolicies.html for the Office of Undergraduate Studies' full list of campus-wide policies and follow up with me if you have questions.

Course Guidelines
Names/Pronouns and Self-Identifications:

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering inclusive and equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to in this class, both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). Keep in mind that the pronouns someone uses are not necessarily indicative of their gender identity. Visit trans.umd.edu to learn more.

Additionally, it is your choice whether to disclose how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all of your fellow Terps.

Communication with Instructor:
- **Email:** Please email me at ruangmas@umd.edu. I will do my best to respond to emails within 24 business hours.
- **ELMS:** I will send IMPORTANT announcements via ELMS. You must make sure that your email & announcement notifications (including changes in assignments and/or due dates) are

enabled in ELMS so you do not miss any messages. You are responsible for checking your email and ELMS inbox with regular frequency.

Assessments

General Guidelines:

- Student learning will be measured by the assessments listed on the Course Schedule. Additional details on how assessments will be evaluated will be posted to ELMS.
- Assessments must be submitted by the due dates and times posted on ELMS.
- Students are responsible for ensuring submitted files are of the correct type, are non-corrupted, and are the intended version of the file. Files that do not fulfill these expectations may not receive credit.
- Students are responsible for their individual contributions to team assessments. Team-based assessments will require communication, collaboration, and iteration to successfully complete.
- Unless a student has communicated with the Faculty Leader beforehand, they must submit their Progress Report before each week's Lab Consultation and be on time for each meeting.

Final Grade Cutoffs:

Grade	Cutoff		Grade	Cutoff		Grade	Cutoff		Grade	Cutoff		Grade	Cutoff
A+	97%		B+	87%		C+	77%		D+	67%		F	<60%
A	93%		B	83%		C	73%		D	63%			
A-	90%		B-	80%		C-	70%		D-	60%			

- Final grades will be rounded to the nearest number. For example, a final grade of 89.5% will be rounded up to 90% (A-) and a final course grade of 89.4% will remain 89% (B+).

Grading Structure:

Name	% of grade
ASN1. Modeling Training	10
ASN2. Survey & Resume	5
ASN3. Lab Consultations & Progress Report	10
ASN4. Research Deliverables [Team]	70
ASN5.1. Career Readiness: Reporting	2.5
ASN5.2. Career Readiness: Reflection	2.5

All assessment scores will be posted on the course ELMS page. If you would like to review any of your grades or have questions about how something was scored, please email me to schedule a time for us to meet and discuss.

Assessment Descriptions:

ASN	Description	Learning Outcome(s)
1	Each student will complete exercises in DataCamp and guided paper replications to understand modeling for inference and prediction. The three assignments in this group and their percentage of the total score are: ● ASN1.1. Basic Modeling Courses in DataCamp (3%) ● ASN1.2. Replicate Table 2 (4%) ● ASN1.3. Machine Learning Courses in DataCamp (3%)	2, 10
2	Each student will complete a survey to share your research background, interests, and availability. The two assignments in this group and their percentage of the total score are: ● ASN2.1. Availability & Interest Survey (1%) ● ASN2.2. Resume (4 %)	4
3	From weeks 3 through 12, each student must come to a Lab Consultation and submit a Progress Report. The score for each week's Lab Consultation & Progress Report is weighted equally. Each student will be graded on 3 criteria, including: ● Punctuality and participation in Lab Consultations ● Completion of Progress Report ● Completion or effort toward assigned tasks	3, 5, 6
4	Each team will submit 8 deliverables showcasing their research progress, methods, and results. The assignments in this group and their percentage of the total score are: ● ASN4.1. Team Contract & Research Plan (2%) ● ASN4.2. GitHub-Flavored Markdown Draft I (10%) ● ASN4.3. Meeting Notes & Updated Research Plan (2%) ● ASN4.4. GitHub-Flavored Markdown Draft II (10%) ● ASN4.5. Poster Draft (10%) ● ASN4.6. Final Poster (15%) ● ASN4.7. In-class Presentation (6%) ● ASN4.8. Final GitHub-Flavored Markdown Page (15%)	ALL
5.1.	Each student will complete a short survey reporting on goals for joining FIRE and measuring progress on Career Readiness.	ALL
5.2.	Each student will reflect on their experiences and accomplishments in FIRE Semester 3.	ALL

Academic Integrity

For this course, some of your assignments will be collected via Turnitin on our course ELMS page. I have chosen to use this tool because it can help you improve your scholarly writing and help me verify the integrity of student work. For information about Turnitin, how it works, and the feedback reports you may have access to, visit Turnitin Originality Checker for Students.

The University's Code of Academic Integrity is designed to ensure that the principles of academic honesty and integrity are upheld. In accordance with this code, the University of Maryland does not tolerate academic dishonesty. Please ensure that you fully understand this code and its implications because all acts of academic dishonesty will be dealt with in accordance with the provisions of this code. All students are expected to adhere to this Code. It is your responsibility to read it and know what it says, so you can start your professional life on the right path. **As future professionals, your commitment to high ethical standards and honesty begins with your time at the University of Maryland.**

It is important to note that course assistance websites, such as CourseHero, or AI-generated content are not permitted sources unless the instructor explicitly gives permission. Material taken or copied from these sites can be deemed unauthorized material and a violation of academic integrity. These sites offer information that might be inaccurate or biased and most importantly, relying on restricted sources will hamper your learning process, particularly the critical thinking steps necessary for college-level assignments.

Additionally, students may naturally choose to use online forums for course-wide discussions (e.g., Group lists or chats) to discuss concepts in the course. However, collaboration on graded assignments is strictly prohibited unless otherwise stated. Examples of prohibited collaboration include: asking classmates for answers on assignments, asking for access codes to clicker polls, etc. Please visit the **Office of Undergraduate Studies' full list of campus-wide policies** and reach out if you have questions.

If you are ever unclear about acceptable levels of collaboration, ***please ask***! To help you avoid unintentional violations, ***the following table*** lists levels of collaboration that are acceptable for each graded exercise. Each assignment will contain more specific information regarding acceptable levels of collaboration.

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Assessment	OPEN NOTES	LEARN ONLINE	GATHER CONTENT With AI	ASK FRIENDS	WORK IN GROUPS
ASN1. Modeling Training	✔	✔	—	✔	—
ASN2. Survey & Resume	✔	✔	—	—	—
ASN3. Lab Consultation & Report	—	—	—	✔	✔
ASN4. Team Deliverables	✔	—	✔	✔	✔
ASN 5.1. Career Readiness: Reporting	✔	—	—	—	—
ASN 5.2. Career Readiness: Reflection	✔	—	—	—	—

Course Outline

Unless otherwise noted, assignments are due before the start of our regularly scheduled class time.

Week #	Week of	Course Activities	ASN(s) Due
1	8/27	● Introduce Semester Plans ● Review Research Projects	NONE
2	9/3	● Introduce Difference-in-Differences Model	ASN1.1.
3	9/10	● Team Formation	ASN1.2., ASN2.1.
4	9/17	● Introduce Spatial Data Manipulation	ASN3.1., ASN4.1.
5	9/24	● Discuss Modeling for Inference	ASN3.2.
6	10/1	● Interpret & Report Results	ASN3.3.
7	10/8	● Create GitHub-Flavored Markdown Pages	ASN3.4.
8	10/15	● Discuss Results with Faculty Collaborators	ASN3.5., ASN4.2.
9	10/22	● Introduce Machine Learning for Prediction	ASN1.3., ASN3.6, ASN4.3.
10	10/29	● Introduce Machine Learning for Prediction	ASN3.7.
11	11/5	● Introduce Synthetic Controls	ASN3.8., ASN4.4.
12	11/12	● Discuss How to Present Yourself & Your Research	ASN3.9
13	11/19	● Discuss How to Improve GitHub-Flavored Markdown Pages and Posters	ASN3.10
14	11/25	● **Thanksgiving Recess: Nov. 27 - Dec. 1** ● **No class**	ASN2.2., ASN4.5.
15	12/3	● Present Posters to Faculty Collaborators ● Present Posters at the FIRE Summit (on 12/6)	ASN4.6., ASN4.7, ASN4.8 Due 12/9 at 5 pm: ASN5.1., ASN5.2.

- **The semester ends on Monday, December 9. No late assignments will be accepted past this date.**
- **This course does not have a final exam.**

Note: This is a tentative schedule, and subject to change as necessary – monitor the course ELMS page for current deadlines. In the unlikely event of a prolonged university closing, or an extended absence from the university, adjustments to the course schedule, deadlines, and assignments will be made based on the duration of the closing and the specific dates missed.

Resources & Accommodations

Accessibility and Disability Services:

The University of Maryland is committed to creating and maintaining a welcoming and inclusive educational, working, and living environment for people of all abilities. The University of Maryland is also committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of the University, or be subjected to discrimination. The **Accessibility & Disability Service (ADS)** provides reasonable accommodations to qualified individuals to provide equal access to services, programs, and activities. ADS cannot assist retroactively, so it is generally best to request accommodations several weeks before the semester begins or as soon as a disability becomes known. Any student who needs accommodations should contact me as soon as possible so that I have sufficient time to make arrangements.

For assistance in obtaining an accommodation, contact Accessibility and Disability Service at 301-314-7682, or email them at adsfrontdesk@umd.edu. Information about sharing your accommodations with instructors, note taking assistance, and more is available from the **Accessibility and Disability Service**.

Student Resources and Services:

Taking personal responsibility for your own learning means acknowledging when your performance does not match your goals and doing something about it. I hope you will come to talk to me so that I can help you find the right approach to success in this course, and I encourage you to visit **UMD's Student Academic Support Services website** to learn more about the wide range of campus resources available to you.

In particular, everyone can use some help sharpening their communication skills (and improving their grade) by visiting **UMD's Writing Center** and scheduling an appointment with the campus Writing Center.

You should also know there are a wide range of resources to support you with whatever you might need (**UMD's Student Resources and Services website** may help). If you feel it would be helpful to have someone to talk to, visit **UMD's Counseling Center** or **one of the many other mental health resources on campus**.

Notice of Mandatory Reporting:

Notice of mandatory reporting of sexual assault, sexual harassment, interpersonal violence, and stalking: As a faculty member, I am designated as a "Responsible University Employee," and I must report all disclosures of sexual assault, sexual harassment, interpersonal violence, and stalking to UMD's Title IX Coordinator per University Policy on Sexual Harassment and Other Sexual Misconduct.

If you wish to speak with someone confidentially, please contact one of UMD's confidential resources, such as **CARE to Stop Violence** (located on the Ground Floor of the Health Center) at 301-741-3442 or the **Counseling Center** (located at the Shoemaker Building) at 301-314-7651.

You may also seek assistance or supportive measures from UMD's Title IX Coordinator, Angela Nastase, by calling 301-405-1142, or emailing titleIXcoordinator@umd.edu.

To view further information on the above, please visit the **Office of Civil Rights and Sexual Misconduct's** website**.**

Basic Needs Security:

If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live, please visit **UMD's Division of Student Affairs website** for information about resources the campus offers you and let me know if I can help in any way.

Veteran Resources:

UMD provides some additional support to our student veterans. You can access those resources at the office of **Veteran Student Life** and the **Counseling Center**. Veterans and active duty military personnel with special circumstances (e.g., upcoming deployments, drill requirements, disabilities) are welcome and encouraged to communicate these to me in advance, if possible.

Course Evaluation

Please submit a course evaluation through Student Feedback on Course Experiences in order to help faculty and administrators improve teaching and learning at Maryland. All information submitted to Course Experiences is confidential. Campus will notify you when Student Feedback on Course Experiences is open for you to complete your evaluations at the end of the semester. Please go directly to the **Student Feedback on Course Experiences** to complete your evaluations. By completing all of your evaluations each semester, you will have the privilege of accessing through Testudo the evaluation reports for the thousands of courses for which 70% or more students submitted their evaluations.

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