

GEO 4285/6938 WATER, RISK, AND EXTREME EVENTS

T| Period 2-3 (8:30am – 10:25am)

R| Period 3 (9:35am – 10:25am)

Location: Keene-Flint Hall 0101

Instructor: Dr. Katy Serafin

Office Hours: TBA

Office: 3140 Turlington Hall

Email: kserafin@ufl.edu, Phone: 352-294-9052 or via Canvas Course Communication

COURSE CATALOG DESCRIPTION

Investigates techniques for evaluating the risks of extreme events related to water in our environment. Presents data and methodologies for estimating the rarity of phenomena including excessive rainfall totals, high and low river levels, coastal storm surge and waves, and drought.

Prerequisite: GEO 3162C Introduction to Quantitative Analysis for Geographers, or STA 3032 Engineering Statistics, or permission of instructor

Credit Hours: 3

Attributes: WR - Fulfills General Education Writing Requirement 6,000 words

COURSE GOALS

1. Know where to find observational datasets of rainfall, river discharge, ocean waves, and sea levels
2. Acquire a working knowledge of statistical techniques for evaluating extreme events
3. Know how to characterize the rarity of an event
4. Recognize differences between stationary and non-stationary processes and analysis techniques
5. Appreciate how statistics are applied to address real-world problems
6. Use computer software to analyze datasets
7. Develop oral and written science communication skills

STUDENT LEARNING OBJECTIVES

A student who successfully completes this course will be able to:

- Identify where to access and how to download water-related datasets
- Manipulate and analyze data using the computer software R
- Estimate the probability of an event for a set of observations
- Compare and contrast the different techniques for evaluating rare events
- Describe physical processes driving variation in data over different time scales
- Explain and disseminate results in written and oral formats

NOTE: GEO4285 is co-listed with GEO6938, which is a graduate course. While the two courses will meet together and complete similar assignments, undergraduate and graduate students will be evaluated on different bases. Graduate students are expected to contribute more frequently during discussions,

deliver a more comprehensive final project presentation, and complete a more rigorous final project paper.

REQUIRED TEXTS

All readings covering background material will be provided in class or on Canvas by the instructor.

COMPUTERS

This course will be held in Keene-Flint Hall 0101 for the Spring 2022 semester. Students must provide their own computer on which to participate in discussion on Canvas prior to class, work on assignments during and/or outside of class, and take quizzes on Canvas. Any required software (such as R or Matlab) will be available to students through UF Apps at <https://info.apps.ufl.edu> or open source downloading.

LIST OF GRADED WORK

Assignment	Description	Requirements	Points (Percent)
Learning Check-Point Quizzes	Short answer, open book/note quiz on Canvas based on readings and lecture material presented that week (10 or 5 points each).	10 weekly quizzes	UG: 100 (10%) G: 50 (5%)
Problem Sets	<p>The course relies heavily upon a series of 8 take-home assignments working with real-world data sets. Each assignment is worth 5% of the total grade, and students will write approximately 400 words per assignment.</p> <p>Using the functions available in R students will be stepped through appropriate operations and produce necessary statistics, tables, and graphs. Students will then be required to use these various data summaries to create comprehensive, supported, and documented answers to the specific assignment questions, within a week. The assignments are supposed</p>	<p>8 weekly problem sets</p> <p>Due the following week after assigned</p>	400 (40%)

	to model/reflect the basic research methods used in academia and the private sector in water-related analyses.		
Discussion Board	<p>This will be a short answer response to reflect on a theme we are learning about.</p> <p>Students will then thoughtfully respond to at least one other student's post.</p>	<p>5 discussions</p> <p>Response to prompt (UG: 10 points, 1% per discussion, G: 5 points, .5% per discussion)</p> <p>Response to another student's prompt (UG: 10 points, 1% per discussion, G: 5 points, .5% per discussion)</p>	<p>UG: 100 (10%) G: 50 (5%)</p>
Semester Project	<p>Throughout the course students will work on example data sets in which they analyze the statistics of extremes in water-related phenomena. Students use the semester project to more thoroughly explore a data set of their own interest.</p> <p>Stages of project development will be graded and returned to provide guidance and ensure progress. Early in the semester, students choose a data set that they are interested in analyzing and interpreting during the term. Students will develop an outline, prepare a brief in-class presentation, and write a paper to disseminate their results.</p>	<ol style="list-style-type: none"> 1) Dataset choice (due week 4; 50 pts; 5%) 2) Project Outline and Initial Data Analysis (due week 8; 100 pts; 10%) <ol style="list-style-type: none"> a. 300 words 3) In-Class Presentations (due week 13; UG: 100 pts; 10%, G:150 pts; 15%) 4) Final Write-up (due finals week; UG: 150 pts; 15%, G: 200 pts; 20%) <ol style="list-style-type: none"> a. 2000-3000 words 	<p>UG: 400 (40%) G: 500 (50%)</p>
Total Possible			1000 (100%)

TYPICAL WEEKLY COURSE SCHEDULE

Students should note that the syllabus is a guideline and that there may be changes to the class schedule. Due dates below are tentative and can be changed at the discretion of the instructor.

Week	Topic	Assignments
1	course logistics, intro to extreme events, observational datasets	Quiz 1
2	descriptive statistics, review of probability and random processes	Quiz 2
3	assigning risk- plotting positions, return periods, and confidence bounds	Quiz 3 Problem Set 1 due
4	fitting probability distributions	Quiz 4 dataset choice due
5	intro to extreme value theory	Quiz 5 Problem Set 2 due
6	block maxima approach	Quiz 6 Problem Set 3 due
7	peak over threshold approach	Quiz 7
8	point process approach	project outline and data analysis due
9	choosing the best model	Quiz 8 Problem Set 4 due
10	<i>SPRING BREAK- NO CLASS</i>	
11	extreme value theory applications	Problem Set 5 due
12	non-stationarity and extremes -seasonality	Quiz 9 Problem Set 6 due
13	non-stationarity and extremes – interannual/decadal	in class presentations due

14	non-stationarity and extremes – trends	Problem Set 7 due
15	climate change and extremes	Quiz 10 Problem Set 8 due
16	climate change and extremes; course wrap-up <i>READING DAY – NO CLASS</i>	
FINALS WEEK		Final Project due

WRITING ASSESSMENT RUBRIC

	SATISFACTORY (Y)	UNSATISFACTORY (N)
CONTENT	Papers exhibit at least some evidence of ideas that respond to the topic with complexity, critically evaluating and synthesizing sources, and provide at least an adequate discussion with basic understanding of sources.	Papers either include a central idea(s) that is unclear or off- topic or provide only minimal or inadequate discussion of ideas. Papers may also lack sufficient or appropriate sources.
ORGANIZATION AND COHERENCE	Documents and paragraphs exhibit at least some identifiable structure for topics, including a clear thesis statement but may require readers to work to follow progression of ideas.	Documents and paragraphs lack clearly identifiable organization, may lack any coherent sense of logic in associating and organizing ideas, and may also lack transitions and coherence to guide the reader.
ARGUMENT AND SUPPORT	Documents use persuasive and confident presentation of ideas, strongly supported with evidence. At the weak end of the Satisfactory range, documents may provide only generalized discussion of ideas or may provide adequate discussion but rely on weak support for arguments.	Documents make only weak generalizations, providing little or no support, as in summaries or narratives that fail to provide critical analysis.
STYLE	Documents use a writing style with word choice appropriate to the context, genre, and discipline. Sentences should display complexity and logical sentence structure. At a minimum, documents will display a less precise use of vocabulary and an uneven use of sentence structure or a writing style that occasionally veers away from word choice or	Documents rely on word usage that is inappropriate for the context, genre, or discipline. Sentences may be overly long or short with awkward construction. Documents may also use words incorrectly.

	tone appropriate to the context, genre, and discipline.	
MECHANICS	Papers will feature correct or error-free presentation of ideas. At the weak end of the Satisfactory range, papers may contain some spelling, punctuation, or grammatical errors that remain unobtrusive so they do not muddy the paper's argument or points.	Papers contain so many mechanical or grammatical errors that they impede the reader's understanding or severely undermine the writer's credibility.

RECOMMENDED WRITING/MANUAL

The American Psychological Association (APA) Style Guide, <https://apastyle.apa.org/>

Another good resource:

https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/in_text_citations_the_basics.html

GRADING SCALE

Note: A grade of C- is not a qualifying grade for major, minor, Gen Ed, or College Basic distribution credit. For information on UF grading policies, visit: <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

A	92.5– 100% of possible points		C	73.5 – 76.4%
A-	89.5– 92.4%		C-	69.5 – 73.4%
B+	86.5 – 89.4%		D+	66.5 – 69.4%
B	83.5 – 86.4%		D	62.5 – 66.4%
B-	79.5 – 83.4%		D-	59.5 – 62.4%
C+	76.5 – 79.4%		E	<59.5

GENERAL COURSE POLICIES

Attendance: This course will twice per week. Students are expected to attend each class period.

Absences can be excused with proper documentation according to university policy. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Late Work: Work that is handed in late will receive an automatic 10% deduction. If you foresee an issue with a deadline, clemency may be granted for late work if you speak with me EARLY before submission with valid excuse, including the possibility of COVID-related problems. Please communicate to me any problems with assignments submissions or discussions. Please document your problems as best possible (doctor's or ER slip, obituary, etc.). **No late work will be accepted after the last day of classes, April 20th.** Make-up assignments, and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Grade Disputes: Should a student wish to dispute any grade received in this class (other than simple addition errors), the dispute must be in writing and be submitted to the instructor within a week of receiving the grade. The dispute should set out very clearly, the grade that the student believes the assignment should have received as well as why they believe that they should have received such a grade.

Cell Phones: Cell phones must be turned to silent or, for emergencies only, be set to “vibrate” during class. In the event of an emergency (and in order to keep from disturbing others), you must leave the classroom to accept an emergency call. You may not answer a call or text in the classroom. Disregard for these guidelines may result in disciplinary action, which could include the student being excused from class and marked absent for that day.

WRITING REQUIREMENT

This course confers 6000 words towards the Writing Requirement (WR), which ensures students both maintain their fluency in writing and use writing as a tool to facilitate learning. While helping students meet the broad learning outcomes of content, communication, and critical thinking, the instructor will evaluate and provide feedback on students’ written assignments with respect to grammar, punctuation, clarity, coherence, and organization.

Course grades have two components. To receive Writing Requirement credit, a student must receive a grade of C or higher and a satisfactory completion of the writing component of the course.

ACADEMIC HONESTY

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.”

The Honor Code (<https://sccr.dso.ufl.edu/policies/studenthonor-code-student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor in this class.

Violations of the Honor Code such as plagiarism will not be tolerated. Acts of plagiarism will receive a 0 on the assignment as well as disciplinary action for academic integrity.

I encourage you to work in groups on the assignments as there is a great deal to be gained mutually by working together. **HOWEVER**, in constructing your individual reports make sure that this is performed on an individual basis. I read every word of every report. It is amazing how individual words and phrases “jump out” of texts as having been read elsewhere or being written in a “different voice,” so even more subtle forms of collaboration in the final reports are detectable.

STUDENTS REQUIRING ACCOMODATIONS

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

COURSE EVALUATION

Students are expected to provide professional and respectful feedback on the quality of instruction in this

course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available from the [Gatorevals website](#). Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via the evaluation system. Summaries of course evaluation results are available to students at the [public results website](#).

COUNSELING AND MENTAL HEALTH RESOURCES

Students facing difficulties completing the course or who are in need of counseling or urgent help should call the on-campus Counseling and Wellness Center (352-392-1575; <https://counseling.ufl.edu/>).

WRITING STUDIO

The writing studio is committed to helping University of Florida students meet their academic and professional goals by becoming better writers. Visit the writing studio online at <http://writing.ufl.edu/writing-studio/> or in 302 Tigert Hall for one-on-one consultations and workshops.

ADDITIONAL CAMPUS RESOURCES

Academic Resources E-learning technical support, 352-392-4357 (select option 2) or email to Learning-support@ufl.edu. <https://lss.at.ufl.edu/help.shtml>

Career Resource Center, Reitz Union, 352-392-1601. Career assistance and counseling. <http://www.crc.ufl.edu> Library Support, <http://cms.uflib.ufl.edu/ask> Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 352-392-2010 or 352-392-6420. General study skills and tutoring. <http://teachingcenter.ufl.edu/> Writing Studio, 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers. <http://writing.ufl.edu/writing-studio/>
Student Complaints, <https://registrar.ufl.edu/writtencomplaints>

Health and Wellness Resources

U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or 352-392-1575 so that a team member can reach out to the student.

Sexual Assault Recovery Services (SARS), Student Health Care Center, 352-392-1161. More information on resources to help students with sexual violence issues at www.umatter.ufl.edu/sexual_violence

Sexual Harassment, Information on UF policies, awareness, reporting, and counseling at www.hr.ufl.edu/managerresources/policies-2/sexual-harassment/ University Police Department, 352-392-1111 (or 9-1-1 for emergencies). <http://www.police.ufl.edu/>