

# **GEO 4285: MODELS IN GEOGRAPHIC HYDROLOGY (WATER, RISK, AND EXTREME EVENTS)**

T| Period 4 (10:40 - 11:30am)

R| Period 4-5 (10:40am - 12:35pm)

Instructor: Dr. Katy Serafin

Office Hours: T/R 1-2pm, or by appointment \*

Office: 3203 Turlington Hall; Fall 2020 ONLINE, including office hours!

Email: [kserafin@ufl.edu](mailto:kserafin@ufl.edu), Phone: 352-294-9052 or via Canvas Course Communication

\*all office hours will be held via Zoom

## **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 computer software (e.g. Excel, R, or Matlab)
- Identify where and when extreme value analyses can be used
- 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:** This course is co-listed with GEO6938, which is a graduate course. While the two courses will meet together and complete similar assignments and exams, undergraduate and graduate students will be

evaluated on different bases. Graduate students will use more advanced computer software (e.g., Matlab, R, etc.), contribute more frequently in 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 remotely in a synchronous format. Students must provide their own laptop computer on which to work on assignments during and/or outside of class. Any required software (such as Microsoft Excel, R or Matlab) will be available on students’ laptops through UF Apps at <https://info.apps.ufl.edu>.

**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 points each).	10 weekly quizzes	100 (10%)
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 basic intrinsic functions available in Microsoft Excel, Matlab, or 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.</p>	<p>8 weekly problem sets</p> <p>Due the following week after assigned</p>	400 (40%)

	The assignments are supposed to model/reflect the basic research methods used in academia and the private sector in water-related analyses.		
Discussion Board	This will be a short answer response to a prompt about a theme we are learning about. Students are encouraged to thoughtfully respond to each other's posts.	10 discussions	100 (10%)
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"> <li>1) Dataset choice (due week 4; 50 pts; 5%)</li> <li>2) Project Outline and Initial Data Analysis (due week 8; 100 pts; 10%) <ol style="list-style-type: none"> <li>a. 300 words</li> </ol> </li> <li>3) In-Class Presentations (due week 13; 100 pts; 10%)</li> <li>4) Final Write-up (due finals week; 150 pts; 15%) <ol style="list-style-type: none"> <li>a. 2000-3000 words</li> </ol> </li> </ol>	400 (40%)
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.

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

**WRITING ASSESSMENT RUBRIC**

	<b>SATISFACTORY (Y)</b>	<b>UNSATISFACTORY (N)</b>
<b>CONTENT</b>	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.
<b>ORGANIZATION AND COHERENCE</b>	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.
<b>ARGUMENT AND SUPPORT</b>	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.
<b>STYLE</b>	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 tone appropriate to the context, genre, and discipline.	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.
<b>MECHANICS</b>	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	Papers contain so many mechanical or grammatical errors that they impede the reader’s understanding or severely undermine the writer’s credibility.

	that remain unobtrusive so they do not muddy the paper’s argument or points.	
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**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](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 meet synchronously and I expect you to. Logging in once per week will NOT be sufficient. No specific points towards the grade are reserved solely for your virtual attendance. Students who withdraw from the course must do so according to the UF deadlines. No students will be automatically dropped from the course. University criteria for excused absence can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

**Late Work:** Late work will only be accepted in exceptional circumstances, but you must contact me immediately if you need an exception. The earlier you contact me to request a late submission the better. Requests will be considered on a case by case basis. 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.

**COVID-19 Statement:** Our class sessions may be audio-visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate verbally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

### **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.

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**

Student feedback is greatly appreciated and taken seriously. Students are expected to provide professional and respectful feedback on the quality of instruction of this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menus under GatorEvals, or via <http://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

## **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](mailto: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](http://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/](http://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/>