Cover Sheet: Request 14884

GEO 4285 –Models in Geographic Hydrology

Info

Process	Course|Modify|Ugrad/Pro
Status	Pending at PV - University Curriculum Committee (UCC)
Submitter	Katherine Serafin kserafin@ufl.edu
Created	4/11/2020 12:28:55 PM
Updated	4/21/2020 9:10:07 AM
Description of request	Requesting a change in course title, description, and pre/corequisites for GEO4285. These changes are requested to reflect 1) updates in techniques, approaches, and technology since the course was last taught 9 years ago, 2) the generalizable nature of the methods taught across water-related phenomena beyond hydrology, and 3) the expertise of the new faculty hired to teach the course.

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	CLAS - Geography 011609000	Jane Southworth		4/11/2020
GEO4285_WaterRiskExtremeEvents.pdf GEO4285_ModelsGeogHydrol_2011.pdf					4/11/2020 4/11/2020
College	Approved	CLAS - College of Liberal Arts and Sciences	Joseph Spillane		4/21/2020
No document changes					
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			4/21/2020
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					
College Notified					
No document changes					

Course|Modify for request 14884

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Submitter: Katherine Serafin kserafin@ufl.edu
Created: 4/11/2020 11:19:41 AM
Form version: 1

Responses

Current Prefix GEO
Course Level 4
Number 285
Lab Code None
Course Title Models in Geographic Hydrology
Effective Term Earliest Available
Effective Year Earliest Available
Requested Action Other (selecting this option opens additional form fields below)
Change Course Prefix? No

Change Course Level? No

Change Course Number? No

Change Lab Code? No

Change Course Title? Yes
Current Course Title Models in Geographic Hydrology
Proposed Course Title Water, Risk, and Extreme Events
Change Transcript Title? Yes
Current Transcript Title Models Geog Hydrol
Proposed Transcript Title (30 char. max) Water, Risk, & Extreme Events
Change Credit Hours? No

Change Variable Credit? No

Change S/U Only? No

Change Contact Type? No

Change Rotating Topic Designation? No

Change Repeatable Credit? No

Change Course Description? Yes

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Current Course Description Investigates the numerical and computational techniques available for the extraction of geographic information from hydrometeorologic data.
Proposed Course Description (500 characters max) 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.
Change Prerequisites? Yes
Current Prerequisites GEO 3162C and GEO 3280 or STA 3032
Proposed Prerequisites GEO 3162C or STA 3032 Engineering Statistics or permission of instructor

Change Co-requisites? Yes
Current Co-requisites GEO 4167C
Proposed Co-requisites None
Rationale A change in course name from "Models in Geographic Hydrology" to "Water, Risk, and Extreme Events" is requested to reflect the course content, which focuses on estimating rare, extreme events, more appropriately. A name change will also allow for the course to appeal to a broader range of students who will find the techniques generalizeable beyond the discipline of hydrology. The course hasn't been in taught in 9 years. Thus, some of the course content has changed due to updates in modeling techniques, application, and technology as well as to reflect the expertise of the new faculty hired to teach the course. There is an accompanying change in the course description, which highlights both the range of water-related phenomena the course techniques are relevant to as well as the emphasis on extreme event analysis.

The prerequisite GEO 3280 and corequisite GEO 4167C are too restrictive. This course will be promoted to and hopefully taken by students from a range of departments. An introductory course in applied statistics course will provide the required background for this class. The prerequisite, GEO 3280, may also not be offered consistently in the future.

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GEOGRAPHY 4285 Spring 2011
Models in Geographic Hydrology
Dr. Peter Waylen: prwaylen@geog.ufl.edu

Where: Turlington 3006
When: Tuesday periods 4-5 (10:40 – 12:35), Thursday period 4 (10:40 – 11:30)
Office Hours: Tuesday 2-4 p.m. Wednesday 1-3 p.m.
Turlington 3127.

INTRODUCTION:
This course explores some of the ways in which time series of hydrometeorolgic variables are investigated in order to determine the risk of various phenomena, such as floods, droughts and heatwaves. The statistical properties of these variables are examined and summarized in such a way as to determine the changing nature of the physical generating processes and associated risks over geographic space.

COURSE DESCRIPTION:
Investigates the numerical and computational techniques available for the extraction of geographic information from hydrometeorolgic data. (WR)

COURSE PREREQUISITES:
GEO3162C Introduction to Quantitative Analysis for Geographers
GEO3280 Principles of Geographic Hydrology, or
STA3032 Engineering Statistics

COURSE COREQUISITES:
GEO4167C Intermediate Quantitative Analysis for Geographers

EVALUATION AND GRADES:

Take-home assignments: (70%)
The course relies heavily upon a series of seven take-home assignments working with real-world data sets each worth 10% of the final grade. Students will be set a research question and sent appropriate data. Using the basic intrinsic functions available in Microsoft Excel, students will be stepped through appropriate operations and produce the necessary statistics, tables and graphs. Students will then be required to use these various data summaries to create a comprehensive, supported and documented answer to the specific research question, within a week. The assignments are supposed to model/reflect the basic research methods used in academia and the private sector in hydrometeorological analyses.

Mid-term examination: (15%)
This will be a short answer format (diagrams, a few sentences) to questions pertaining to the major topics introduced in the first half of the class

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Final examination: (15%)

As in the mid-term, except based on major topics introduced in the second half of the class

GRADING SCHEME:

A = 90 and above
A- = 85-89.9
B+ = 80-84.9
B = 75-79.9
B- = 70-74.9
C+ = 65-69.9
C = 60-64.9
C- = 55-59.9
D+ = 50-54.9
D = 45-49.9
D- = 40-44.9
E < 40

COURSE TEXT:

There is no single course text for the course. Selected readings from published articles will be made available to students from **Target Copy.**

Important:

To be successful you will need a level of maturity and self-discipline. Some points:

- There is no substitute for **ATTENDING CLASS REGULARLY** and using office hours to stay up with the material.
- **DON'T PROCRASTINATE**, manage your time wisely and review the lecture materials regularly. If you have doubts or need information clarified **COME TO OFFICE HOURS.**
- **START THE ASSIGNMENTS EARLY.** You have a week to complete them for a reason! If you make a habit of starting these early, then you will be able to talk to your colleagues or myself about any issues you may have. That sort of support will just not be available the night before the assignment is due.

STUDENT SUPPORT SERVICES:

Special Accommodations

Students requesting disability-related academic accommodations must first register with the Disability Resource Center. The Center will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

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ACADEMIC HONESTY:
You are all bound by the student academic honor code.

We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

"On my honor, I have neither given nor received unauthorized aid in doing this assignment."

I encourage you to work in groups on the assignments as there is a great deal to 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.

On a personal note, be careful if selecting "partners". Ensure that these are "equal partnerships"

EXCUSED ABSENCES AND EXTRA CREDIT:
In the interest of fairness to **all** students in the class, there will be **NO EXTRA CREDIT.** However, I appreciate that unexpected events occur in all of our lives. If such events (illness, personal problems, etc.) befall you, I will give you the choice of either taking a make-up exam or skipping the exam, upon production of **official documentation** of your case. If you chose to skip the exam/test, your grade will be based purely upon your performance in those forms of evaluation that you did take.

TOPICS COVERED:

Random Processes, discrete and continuous

Review of Probability Distributions

Normal probability distribution
- Annual precipitation totals
- Mean annual flows
- Timing of major events

Return periods and confidence bounds

Extreme Value Theory
- Gumbel distribution
- Weibull distribution
- Frechet distribution
- Generalized Extreme Value distribution
- Floods

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Droughts
Annual/seasonal/monthly extreme temperatures and wind speeds

Crossing Theory and Partial Duration Series
Bernoulli processes
Poisson distribution
Exponential distribution
Generalized Pareto distribution
Linkage to Extreme Value distributions
Over-bank flows
Heat waves
Cold spells and freezes

Markov process
Modelling daily rainfall characteristics
Serial autocorrelation
Simple Monte Carlo simulation
Frequency and magnitude of measurable daily precipitation

Trends, periodicities and jumps
Linear regression
Fourier analysis
Spectral analysis
Wavelet analysis
Break detection

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GEO 4285: WATER, RISK, AND EXTREME EVENTS FALL 2020

T| Period 4 (3012 Turlington Hall)
R| Period 4-5 (3018 Turlington Hall)

Instructor: Dr. Katy Serafin
Office: 3203 Turlington Hall
Phone: 352-294-9052

Email: kserafin@ufl.edu
Office Hours: T/R 1-3pm

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
6000 word writing requirement

Credit Hours: 3
Attributes: WR - Fulfills General Education Writing Requirement 6,000 words

COURSE GOALS

1. Know where to find observational datasets such as rainfall, river discharge, coastal storm surge and waves
2. Acquire a working knowledge of statistical techniques and their assumptions for evaluating extreme events
3. Know how to characterize the rarity of an event
4. Recognize the difference between stationary and non-stationary processes and analyses
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 seasonal, decadal, and long-term time scales
- Explain and disseminate results in written and oral formats

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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 TUR 3012 and TUR 3018, which is a classroom with no computer terminals. 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)
Attendance	Attendance is taken and recorded during each class meeting. Students earn 0.5 point per each class attended. One missed class is permitted per semester, after which each absence that does not meet university criteria (see below) for "excused" will be marked as 0 points.	Students attend every class.	14.5 (1.45%)
Learning Check-Point Quizzes	Weekly, short answer, open book/note quiz on Canvas based on readings and lecture material presented that week (10 points each).	13 weekly quizzes, lowest score dropped Due by noon Wednesday	120 (12%)
Problem Sets	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. Using the basic intrinsic functions available in Microsoft Excel, Matlab, or R, students will be stepped through appropriate operations and produce the necessary statistics, tables and graphs. Students will then be required to use	8 weekly problem sets Due the following week after assigned	400 (40%)

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	these various data summaries to create a comprehensive, supported and documented answers to the specific research question, within a week. The assignments are supposed to model/reflect the basic research methods used in academia and the private sector in water-related analyses.		
Midterm	This will be a short answer format (diagrams, a few sentences) to questions pertaining to the major topics introduced in the first half of the class.	Short-answer and diagram questions, closed book	150 (15%)
Semester Project	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. 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.	1) Data set choice (due week 4; 15.5 pts [1.55%]) 2) Project Outline (due week 10; 50 pts; 5%) a. 300 words 3) In-Class Presentations (due week 13; 100 pts; 10%) 4) Final Write-up (due week 16; 150 pts; 15%) a. 2000-3000 words	315.5 (31.55%)
Total Possible			1000 (100%)

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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, Introduction to Extreme Events	Quiz 1
2	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	Assigning Risk – Plotting Positions, Return Periods, and Confidence Bounds	Quiz 4 Dataset Selection
5	Fitting Probability Distributions	Quiz 5 Problem Set 2 due
6	Order Statistics	Quiz 6 Problem Set 3 due
7	Extreme Value Theory	MIDTERM
8	Block Maxima Approach	Quiz 7 Problem Set 4 due
9	Crossing Theory	Quiz 8 Problem Set 5 due
10	Peak Over Threshold Approach	Quiz 9 Final Project Outline Due
11	Non-Stationarity and Extremes -Seasonality	Quiz 10 Problem Set 6 due
12	Non-Stationarity and Extremes – interannual/decadal	Quiz 11 Problem Set 7 due
13	Non-Stationarity and Extremes – Trends In-Class Presentations due	Quiz 12
14	Climate Change and Extremes *THANKSGIVING – NO CLASS*	Problem Set 8 due
15	Climate Change and Extremes	Quiz 13

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16 Course Wrap-Up, final reflections and questions
READING DAY – NO CLASS

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 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.
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.

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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

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: Attendance is taken and recorded during each class meeting. Students earn 0.5 point per each class attended. One missed class is permitted per semester. Each absence that does not meet university criteria for "excused" will be marked as 0 points. 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 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

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.

Recordings and Notes: It is not permitted to sell notes or recordings from this class without written consent of the instructor. Nor are students permitted to disseminate recordings of the instructor lecturing or post copies of assignments or exams on the internet.

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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

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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/

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