UF | **UNIVERSITY of FLORIDA**

GEO 4938: Geospatial Analysis of Hazard Vulnerability
Department of Geography
College of Liberal Arts & Sciences, University of Florida

COURSE SYLLABUS

Instructor:	Dr. Kevin Ash	Term:	Fall 2018
Office:	TUR 3124	Class Meeting Days:	Monday
Phone:	TBA	Class Meeting Hours:	10:40 am – 1:40 pm
Email:	kash78@ufl.edu	Class Location:	TUR 3018
Office Hours:	Tues and Wed 2-3 pm, or by appointment	Course Credits:	3 hours

I. Course Overview

In this course, students will learn fundamental concepts and widely used methodologies for assessment of hazard vulnerability using geospatial data and analysis techniques. They will benefit from lab assignments using ArcGIS (primarily) and other geospatial and quantitative analysis software. This course will not use a simple hazard-by-hazard approach, but will integrate perspectives from the physical and social sciences to identify and describe risk, vulnerability, and disaster resilience with empirical data and real-world examples. This unique course will provide critical training and experience for students interested in hazards geography, GIS, emergency management, risk communication, or urban planning.

The course begins by reviewing key concepts relevant for geospatial analysis of risk and vulnerability such as the definitions of these terms and practical issues such as geographic scale and the modifiable areal and temporal unit problems. Then, we will investigate how different types of hazards are represented spatially and how these differences make multi-hazard mapping and analysis challenging. We will then discuss the advantages and pitfalls of using casualty and economic loss datasets, before introducing students to the wide array of socioeconomic datasets frequently used in social vulnerability and resilience analyses. Students will learn several different approaches and methodologies for social vulnerability mapping and analysis, and will learn how physical (risk) and social vulnerability analyses can be integrated into a single quantitative assessment. Students will also be exposed to participatory mapping approaches for risk and vulnerability, and learn how a disaster resilience index can be similar yet distinct from a vulnerability index.

Course Content Objectives
By the end of the course, students will:
- Discover how the concepts of risk, vulnerability, and resilience are operationalized for geospatial analyses.
- Demonstrate understanding of how risk and vulnerability indices are constructed and mapped using a GIS and how the indices and maps should be interpreted
- Identify and use appropriate geospatial physical and socioeconomic datasets in risk and vulnerability analyses
- Compare and contrast different geospatial analytic methodologies used in risk and vulnerability analyses
- Apply basic and advanced geographic and geostatistical concepts in the context of disaster risk reduction efforts

II. Student Learning Outcomes

Through the course assignments and exams, students will learn to:
- Define the terms risk, vulnerability, and resilience and operationalize these concepts with empirical spatial data
- Perform mapping and assessment of physical hazard risks associated with a variety of hazard types using GIS and geospatial analysis techniques

- Understand how the modifiable areal and temporal unit problems, as well as different data smoothing techniques, can influence conclusions about risk and vulnerability in quantitative and geospatial analysis
- Work with data that contain margins of error and visualize uncertainty in maps
- Download, combine, and map secondary socioeconomic data in a social vulnerability index
- Analyze and map data using multivariate statistics
- Map social and physical data using dasymetric techniques
- Combine and map physical hazard and socioeconomic data for a comprehensive risk and vulnerability analysis
- Communicate analysis findings in written, verbal, cartographic, and graphical formats

III.   Materials and Supplies: Laptop Computer
This course will be held in TUR 3018, which is a studio classroom with no computer terminals. Students must provide their own laptop computer on which to work on assignments and exams during and/or outside of class. Any required software (such as ArcGIS) will be available on students' laptops through UF Apps at https://info.apps.ufl.edu.

IV.   Required Texts and Useful Online Resources
There is no required textbook for this course. The instructor will assign readings on a weekly basis and these will be available via Canvas.

V.   Course Format, Activities, and Basis for Evaluation
The class will meet once per week for a three hour time block on Mondays from 10:40 am to 1:40 pm. The first hour of each class period will consist of a presentation by the instructor about key concepts related to the week's topic. The presentations will be made available to students via Canvas on Monday mornings before class begins. This will give students the opportunity to download the presentation to their own laptop and write notes directly into the file during the presentation. There will be a 30 minute break (about 11:30 am to 12:00 pm) after the presentation during which students and the instructor can eat lunch. We will reconvene at 12:00 pm for the lab portion of the class. During the lab period, we will begin by going through an example GIS lab exercise where the instructor will demonstrate and guide students through each step. This example exercise will take approximately 40-50 minutes. After the example exercise is completed, students will then work on the weekly lab assignment which will be similar to the example GIS exercise. The GIS lab assignment will require students to complete several tasks independently by using what they have learned from the presentation and example exercise. Students are expected to use the remaining 40-50 minutes of the lab period to work on the GIS lab assignment. The instructor will standby to answer questions, troubleshoot software difficulties, and work individually with students. The GIS lab assignment will then be due by the start of class the following Monday (with a couple of exceptions as noted in the weekly schedule provided in this syllabus).

Evaluation and Grading

Class Participation: Class participation will be evaluated based on two components. The first is attendance which will count for 5% of the final grade. Students are expected to attend the lecture and lab portion of the class for each of the 13 days of class during the semester. Students may be excused from absences with appropriate documentation according to the university policy (more information provided in Section VIII below). The other 5% of class participation will be discussion of the weekly readings on Canvas and in class. Students will be required to post their own summaries and critiques of the papers, post responses to classmates' comments, and discuss the papers further during class periods.

Lab Assignments: There will be 11 lab assignments which will amount to 40% of the final grade. The grade will be determined using the best 10 grades out of the 11 assignments, with the lowest grade being dropped. Lab assignments will be due one week after they are assigned, prior to the start of class on Monday morning. There will be a couple of exceptions to this general rule: Lab #1 will be due two weeks after assigned, and Lab #9 will be due 8 days after assigned.

Exams: In total, the two exams will account for 20% of the final grade, 10% each for the Midterm and Final exams. Both exams will be two-hour duration exams with two parts. The first part will be written and will cover concepts the students are learning in the course; the written portion will be short answer and essay questions. The second part of the exams will entail students demonstrating that they can perform analysis of risk and/or vulnerability using GIS, in a similar fashion to the lab assignments except that students will have roughly one hour to complete the given analysis.

Final Project: For the final project, students will use one or more of the GIS methods for analysis of hazard risk and vulnerability covered in the course to perform their own analysis for a location and hazard context of their choosing. The final project paper should be about 2500 words in length and include citations, data tables, and maps and graphs as appropriate. The class project will be worth 30% of the total grade. The majority of the points (25 out of the 30 percentage points) will be related to the paper which each student will write and turn in by December 5th. The remaining 5 percentage points will be for a 10 to 15 minute presentation given on December 3rd. More detailed instructions about the final project will be provided to students via Canvas and in class.

Assignments and Exams	Percent of Final Grade
Class Participation	10%
Lab Assignments	40%
Final Project	30%
Exam #1: Midterm	10%
Exam #2: Final	10%

Grading Scale (%)	
92.5 – 100	A
89.5 – 92.4	A-
86.5 – 89.4	B+
82.5 – 86.4	B
79.5 – 82.4	B-
76.5 – 79.4	C+
72.5 – 76.4	C
69.5 – 72.5	C-
66.5 – 69.4	D+
62.5 – 66.4	D
59.5 – 62.4	D-
< 59.5	E

VI. **Important Dates to Remember:** The due dates below are tentative and can be changed at the discretion of the instructor.

Drop/Add Ends:	Fri, Aug 28th 2018
No Class, Labor Day*	Mon, Sep 3rd 2018
Midterm Exam	**Mon, Oct 15th 2018**
No Class, Fall Break, Homecoming	Fri, Nov 2nd 2018
No Class, Veterans Day*	Mon, Nov 12th 2018
No Class, Thanksgiving Break	Wed-Fri, Nov 21-23rd 2018
Final Project Due	**Wed, Dec 5th 2018**
Reading Days	Thurs-Fri, Dec 6-7th 2018
Final Exam	**Tues, Dec 11th 2018**
Fall 2018 Grades Visible on https://one.uf.edu/dashboard/	Wed, Dec 19th 2018

VII. Weekly Topic Schedule, Assignments, and Exams (Schedule is provisional and subject to change)

Date	Day	Class Topics & Assignments	Read Before Class
Aug 27	M	Course Introduction and Key Concepts: Lab #1	None
Sep 3	M	*Labor Day, No Class*	
Sep 10	M	Physical Hazard Risk Mapping; Lab #2; Lab #1 due	Scheitlin et al. 2013; Deng et al. 2016
Sep 17	M	Multi-Hazard Risk Mapping; Lab #3; Lab #2 due	Tate et al. 2011; Kappes et al. 2012
Sep 24	M	Geospatial Analysis of Damage & Casualties; Lab #4; Lab #3 due	Borden and Cutter 2008; Hahn et al. 2017
Oct 1	M	Demographic Geospatial Data Sources and Visualizing Uncertainty; Lab #5; Lab #4 due	Wong & Sun 2013; Folch et al. 2016
Oct 8	M	GIS-Based Social Vulnerability Analysis; Lab #6; Lab #5 due	Cutter et al. 2003; Flanagan et al. 2011
Oct 15	M	*Midterm Exam; Lab #6 due*	
Oct 22	M	Dasymetric Mapping & Social Vulnerability Analysis; Lab #7	Nelson et al. 2015; Garcia et al. 2016
Oct 29	M	Clustering Methods & Social Vulnerability Analysis; Lab #8; Lab #7 due	Rufat 2013; Wood et al. 2015
Nov 5	M	Risk/Vulnerability Integrated Analysis; Lab #9; Lab #8 due	Karagiorgos et al. 2016; Guillard-Goncalves & Zezere 2018
Nov 12	M	*Veterans Day, No Class; Lab #9 due on Nov 13*	
Nov 19	M	Participatory GIS and Vulnerability Analysis; Lab #10	Cadag & Gaillard 2012; Hazarika et al. 2016
Nov 26	M	Disaster Resilience Index; Lab #11; Lab #10 due	Cutter et al. 2010; Frazier et al. 2013
Dec 3	M	Student Presentations on Final Project; Work on Projects; Lab #11 due	None
Dec 5	W	*Final Project Due*	
Dec 11	T	*Final Exam, 12:30 pm to 2:30 pm in TUR 3018*	

VIII. Course Policies: Attendance, Make-Ups, and Grades

Attendance: Students are expected to attend each and every 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: All assignments submitted after their respective deadlines will be assessed a penalty: ten percentage points if one day late, fifteen percentage points for 2-3 days late, and 30 percentage points for 4-7 days late. Assignments will not be accepted if overdue by more than seven days.

Examination Policies and Reading Days: Course policies are consistent with University policies on during-term exams, final exams, reading days, and make-up exams. Students must notify the instructor as soon as possible in case of absence during an exam and provide documentation as to the reason for the absence. If deemed an excused absence, the student will be permitted a reasonable amount of time to make up the missed exam. More details can be found at https://catalog.ufl.edu/UGRD/academic-regulations/examination-policies-reading-days/.

Grade Dissemination: You can access your scores at any time using the Grade function in Canvas. The instructor will post grades within about one week of the due date of each assignment and the mid-term exam.

Grading Policies for Assigning Grade Points: Information on current UF grading policies for assigning grade points may be found at https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx.

Grades of "Incomplete": The current university policy concerning incomplete grades will be followed in this course. An incomplete grade may be assigned at the discretion of the instructor as an interim grade for a course in which you have completed a major portion of the course with a passing grade, been unable to complete course requirements before the end of the term because of extenuating circumstances, and obtained agreement from the instructor and arranged for resolution of the incomplete grade. Instructors are not required to assign incomplete grades.

IX.   **Course Policies: Technology and Media**

Email: Each of you has a UF email address. It is vital that you maintain an active UF email account and that you **check it often**. This tentative syllabus is **subject to change**, and any changes will be transmitted to you via your UF email account and Canvas (see below). Students should email the instructor if they have questions about any of the lectures, readings, assignments, or exams. You should expect a response within about 24 hours during weekdays. On holidays or weekends, expect a response on the next business day. The instructor will reasonably expect similar time frames for responses to emails sent to students.

Canvas: Course materials such as lectures, readings, the syllabus, and assignment instructions will be available through Canvas (https://elearning.ufl.edu). You will also find all due dates and grades on Canvas. Students must activate their UF GatorLink account in order to use Canvas. If you need help learning how to perform various tasks related to this course or other courses that utilize Canvas, please consult the above webpage. You may also contact the UF Computing Help Desk at (352) 392-HELP(4357) or helpdesk@ufl.edu.

Online Course Evaluation: Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

Recordings and Notes: It is not permitted to sell notes or recordings from this class without the expressed 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.

X.   **Course Policies: Student Expectations**

Disabilities Statement:
Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Academic Conduct Policy: 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 (http://www.dso.ufl.edu/sccr/process/student-conduct-honor-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 of this class.

XI.   **Campus Resources for Students:**

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, 302 Tigert Hall, 352-846-1138. Help brainstorming, formatting, and writing papers. http://writing.ufl.edu/writing-studio/

Student Complaints, https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf

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 Servies (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/manager-resources/policies-2/sexual-harassment/

Counseling and Wellness Center, http://counseling.ufl.edu/cwc/Default.aspx, 352-392-1575;

University Police Department, 352-392-1111 (or 9-1-1 for emergencies). http://www.police.ufl.edu/