UF | UNIVERSITY of FLORIDA

COURSE SYLLABUS

Instructor:	Dr. Kevin Ash	Term:	Fall 2020
Office:	TUR 3128 (but all meetings on Zoom/phone)	Class Meeting Days:	Tuesday
Phone:	352-294-6956	Class Meeting Hours:	12:50 pm – 3:50 pm
Email:	kash78@ufl.edu	Class Location:	Online; Canvas/Zoom
Office Hours:	Mon, Wed, Fri 9-10 am, 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 assignments using ArcGIS Pro (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 and vulnerability 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 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.

NOTE: This course is co-listed with GIS 4324 which is an undergraduate 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 be required to contribute more frequently in reading discussions, complete a longer and more rigorous final project paper, deliver a longer and more comprehensive final project presentation, and graduate students will not be able to consult their notes during the exams.

II.   Course Content Objectives

By the end of the course, students will:
- Discover how the concepts of risk and vulnerability 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

III.   Student Learning Outcomes
Through the course assignments and exams, students will learn to:
- Define the terms risk and vulnerability 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

IV.   Materials and Supplies: Computer
This course will be held online only via Canvas and Zoom for the Fall 2020 semester. <u>Students must provide their own computer on which to attend lectures, participate in discussions, work on assignments, and take exams</u>. Any required software (such as ArcGIS Pro) will be available on students' laptops through UF Apps at <u>https://info.apps.ufl.edu</u> or through student versions provided by the instructor.

V.   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. Citations for the required readings are provided at the end of this document.

VI.   Course Format, Activities, and Basis for Evaluation
The course will be conducted completely online in a synchronous format. The class will meet once per week for a three hour time block on Tuesdays from 12:50 pm to 3:50 pm, via the Zoom meeting capability built into Canvas. The three hour period will be a mix of lecture, discussion of assigned readings, and introduction of each week's new GIS assignment.

Our class lecture and discussion 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 orally 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.

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 class for each of the 14 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 IX below). The other 15% of class participation will be discussion of the weekly readings in written and verbal formats on Canvas. Students will be required to post their own summaries and critiques of the papers and discuss the papers further during class periods. An evaluation rubric is provided below.

Rubric for Evaluation: Online Readings Summaries/Critiques

Task: Write a 300-500 word summary and critique of the weekly assigned readings and submit it via Canvas prior to class. Consult the rubric below to make sure you include all required elements to receive full credit.
(Adapted from two sources: Solan & Linardopoulos 2011, http://jolt.merlot.org/vol7no4/linardopoulos_1211.htm; Reflection/Discussion Critique Rubric, http://www.rcampus.com/rubricshowc.cfm?sp=yes&code=D97AAC&.

Evaluation Category	Standards for Excellent Work	Points	Instructor Comments
Summary of Key Concepts	-Demonstrate comprehension of key concepts from readings -Recognize & define key concepts in summary -Use terms & concepts appropriately in context	/4	
Evaluation & Synthesis of Key Concepts	-Construct generalized judgments and/or arguments about key concepts in readings -Support arguments using specific instances or examples from the readings	/6	

Critique Strategies	-Employ one or more critique strategies such as:
	  ▪ Compare/contrast between readings
	  ▪ Deconstruction of language or logic
	  ▪ Identification of methodological shortcomings
		/6	

Writing & Communication Proficiency	-Organize writing with clear structure:
	  ▪ Introduction
	  ▪ Body
	  ▪ Conclusion
	-Avoid spelling, grammar, syntax, punctuation, or other writing errors
		/4	

GIS Assignments: There will be 9 GIS assignments which will amount to 40% of the final grade. GIS assignments will typically be due one week after they are assigned; exceptions to this are noted in the course schedule.

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 hours in duration. They will be written and will cover concepts the students are learning in the course, using short answer and essay questions. Undergraduate students will be permitted to consult written notes during the exams.

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 2000 words in length and include citations, data tables, and maps and graphs as appropriate. The class project will be worth 20% of the total grade. The majority of the points (15 out of the 20 percentage points) will be related to the paper which each student will write and turn in by December 17th. The remaining 5 percentage points will be for an 8 minute presentation given on December 8th. Students will write a short project proposal that will be due Oct 27th and will receive constructive feedback about the proposed research. More detailed instructions about the final project will be provided to students via Canvas and during class meetings.

Assignments and Exams	Percent of Final Grade

Class Participation	20%
GIS Assignments	30%
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

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

Drop/Add Ends:	Fri, Sep 4th 2020
Midterm Exam	**Tues, Oct 13th 2020**
Thanksgiving	Wed-Fri, Nov 25-27th 2020
Reading Days	Thurs-Fri, Dec 10-11th 2020
Final Exam	**Mon, Dec 14th 2020**
Final Project Due	**Thurs, Dec 17th 2020**
Fall 2020 Grades Visible on https://one.uf.edu/dashboard/	Wed, Dec 23rd 2020

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

Date	Day	Class Topics & Assignments	Read Before Class
Sep 1	Tues	Course Introduction; Assignment #1	None
Sep 8	Tues	Physical Hazard Risk Mapping; Assignment #2; #1 due	Elsner et al. 2012; Deng et al. 2016
Sep 15	Tues	Multi-Hazard Risk Mapping; Assignment #3; #2 due	Tate et al. 2011; Kappes et al. 2012
Sep 22	Tues	Geospatial Analysis of Damage & Casualties; Assignment #4; #3 due	Borden & Cutter 2008; Hahn et al. 2017
Sep 29	Tues	Demographic Geospatial Data Sources & Visualizing Uncertainty; Assignment #5; #4 due	Wong & Sun 2013; Folch et al. 2016
Oct 6	Tues	GIS-Based Social Vulnerability Analysis; Assignment #6; #5 due	Cutter et al. 2003; Flanagan et al. 2011
Oct 13	Tues	*Midterm Exam; Assignment #6 due Oct 20*	
Oct 20	Tues	Social Vulnerability Analysis and COVID-19; Introduction & Discussion of Final Project; Project Proposal Assignment; Assignment #6 due	Karaye and Horney 2020; Khazanchi et al. 2020
Oct 27	Tues	Dasymetric Mapping & Social Vulnerability Analysis; Assignment #7; Project Proposal due	Nelson et al. 2015; Garcia et al. 2016
Nov 3	Tues	Clustering Methods & Social Vulnerability Analysis;	Rufat 2013; Wood et al. 2015

		Assignment #8; #7 due	
Nov 10	Tues	Risk/Vulnerability Integrated Analysis; Assignment #9; #8 due	Koks et al. 2015; Guillard-Goncalves & Zezere 2018
Nov 17	Tues	GIS-Based Disaster Resilience Index, #9 due, No GIS Assignment	Frazier et al. 2014; Cutter and Derakhshan 2018
Nov 24	Tues	*No lecture or discussion this week, work on final project & readings for Dec 1*	
Dec 1	Tues	Vulnerability Analysis Using Participatory & Qualitative GIS Methods, No GIS Assignment	Canevari-Luzardo et al. 2015; Hazarika et al. 2018; Yusuf et al. 2018; Sullivan-Wiley et al. 2019
Dec 8	Tues	Student presentations on final project; Work on final project papers	None
Dec 14	Mon	***Final Exam: 10 am to 12 pm on Canvas***	
Dec 17	Thurs	*Final Project Papers Due*	

IX. Honorlock

Honorlock is an online proctoring service that allows students to take exams on-demand 24/7. There are no scheduling requirements or fees.

You will need a laptop or desktop computer with a webcam, a microphone, and a photo ID. The webcam and microphone can be either integrated or external USB devices.

Honorlock requires that you use the Google Chrome browser; furthermore, the Honorlock extension must be added to Chrome. You can download Chrome here: https://www.google.com/chrome/

 For further information, FAQs, and technical support, please visit Honorlock at https://honorlock.com/students/

X. 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.

Make-Up Exams and Assignments: Requirements for make-up exams, assignments, and other work in this course are consistent with university policies that can be found at catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/.

As this is an online class, you are responsible for observing all posted due dates, and are encouraged to take responsibility for your learning and progress.

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.

XI. 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 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.

XII. 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 Honesty & 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 (sccr.dso.ufl/process/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.

XIII. Campus Resources for Students:

Academic Resources

E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via email at helpdesk@ufl.edu.

Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services at career.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 to make an appointment 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 On-Campus: sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/

On-Line Students Complaints: distance.ufl.edu/student-complaint-process/

Health and Wellness Resources

U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit umatter.ufl.edu/ to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center: Visit https://counseling.ufl.edu/ or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit https://shcc.ufl.edu/.

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

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; ufhealth.org/emergency-room-trauma-center.

COVID-19: If you are experiencing COVID-19 symptoms, please use the UF Health screening system and follow the instructions on whether you are able to attend class. You will be given a reasonable amount of time to make up work if deadlines are missed due to COVID-19 related health problems. Please consult the following links for more information:
- CDC Guidance on Coronavirus Symptoms: https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html
- UF Health COVID-19 Exposure & Symptoms Quick Reference Guide: https://coronavirus.ufhealth.org/screen-test-protect/covid-19-exposure-and-symptoms-who-do-i-call-if/

XIV. Assigned Readings Citations:

Borden, K.A., and S.L. Cutter, 2008. Spatial patterns of natural hazards mortality in the United States, *International Journal of Health Geographics*, 7:64, doi:10.1186/1476-072X-7-64.

Canevari-Luzardo, L., J. Bastide, I. Choutet, and D. Liverman, 2015. Using partial participatory GIS in vulnerability and disaster risk reduction in Grenada, *Climate and Development*, 9: 95-109.

Cutter, S.L., B.J. Boruff, and W.L. Shirley, 2003. Social Vulnerability to Environmental Hazards, *Social Science Quarterly*, 84: 242-261.

Cutter, S.L., and C. Finch, 2008. Temporal and spatial changes in social vulnerability to natural hazards, *Proceedings of the National Academy of Sciences*, 105: 2301-2306.

Cutter, S.L., and S. Derakhshan, 2018. Temporal and spatial change in disaster resilience in US counties, 2010-2015, *Environmental Hazards*, DOI: https://doi.org/10.1080/17477891.2018.1511405.

Deng, Y., B. Wallace, D. Maassen, and J. Werner, 2016. A Few GIS Clarifications on Tornado Density Mapping, *Journal of Applied Meteorology and Climatology*, 55: 283-296.

Elsner, J.B., R.E. Hodges, and T.H. Jagger, 2012. Spatial grids for hurricane climate research, *Climate Dynamics*, 39: 21-36.

Flanagan, B.E., E.W. Gregory, E.J. Hallisey, J.L. Heitgerd, and B. Lewis, 2011. A Social Vulnerability Index for Disaster Management, *Journal of Homeland Security and Emergency Management*, 8: 3.

Folch, D.C., D. Arribas-Bel, J. Koschinsky, and S.E. Spielman, 2016. Spatial Variation in the Quality of American Community Survey Estimates, *Demography*, 53: 1535-1554.

Frazier, T.G., C.M. Thompson, and R.J. Dezzani, 2014. A framework for the development of the SERV model: A Spatially Explicit Resilience-Vulnerability model, *Applied Geography*, 51: 158-172.

Garcia, R.A.C., S.C. Oliveira, and J.L. Zezere, 2016. Assessing population exposure for landslide risk analysis using dasymetric cartography, *Natural Hazards and Earth System Sciences*, 16: 2769-2782.

Guillard-Goncalves, C., and J.L. Zezere, 2018. Combining Social Vulnerability and Physical Vulnerability to Analyse Landslide Risk at the Municipal Scale, *Geosciences*, 8: 294, DOI:10.3390/geosciences8080294.

Hahn, D.J., E. Viaud, and R.B. Corotis, 2017. Multihazard Mapping of the United States, *Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering*, 3: 04016016.

Hazarika, N., D. Barman, A.K. Das, A.K. Sarma, and S.B. Borah, 2018. Assessing and mapping flood hazard, vulnerability and risk in the Upper Brahmaputra River valley using stakeholders' knowledge and multicriteria evaluation (MCE), *Journal of Flood Risk Management*, 11: S700-S716.

Kappes, M.S., M. Keiler, K. von Elverfeldt, and T. Glade, 2012. Challenges of analyzing multi-hazard risk: a review, *Natural Hazards*, 64: 1925-1958.

Karaye, I.M., and J.A. Horney, 2020. The Impact of Social Vulnerability on COVID-19 in the U.S.: An Analysis of Spatially Varying Relationships, *American Journal of Preventive Medicine*, https:doi.org/10.1016/j.amepre.2020.06.006.

Khazanchi, R., E.R. Beiter, S. Gondi, A.L. Beckman, A. Bilinski, and I. Ganguli, 2020. County-Level Association of Social Vulnerability with COVID-19 Cases and Deaths in the USA, *Journal of General Internal Medicine*, https://doi.org/10.1007/s11606-020-05882-3.

Koks, E.E., 2015. Combining hazard, exposure and social vulnerability to provide lessons for flood risk management, *Environmental Science & Policy*, 47: 42-52.

Nelson, K.S., M.D. Abkowitz, and J.V. Camp, 2015. A method for creating high resolution maps of social vulnerability in the context of environmental hazards, *Applied Geography*, 63: 89-100.

Rufat, S., 2013. Spectroscopy of Urban Vulnerability, *Annals of the Association of American Geographers*, 103: 505-525.

Sullivan-Wiley, K.A., A.G. Short Gianotti, and J.P. Casellas Connors, 2019. Mapping vulnerability: Opportunities and limitations of participatory community mapping, *Applied Geography*, 105: 47-57.

Tate, E., S.L. Cutter, and M. Berry, 2010. Integrated multihazard mapping, *Environment and Planning B: Planning and Design*, 37: 646-663.

Wong, D.W., and M. Sun, 2013. Handling Data Quality Information of Survey Data in GIS: A Case of Using the American Community Survey Data, *Spatial Demography*, 1: 3-16.

Wood, N.J., J. Jones, S. Spielman, and M.C. Schmidtlein, 2015. Community clusters of tsunami vulnerability in the US Pacific Northwest, *Proceedings of the National Academy of Sciences,* DOI: https://doi.org/10.1073/pnas.1420309112.

Yusuf, J.E., P. Rawat, C. Considine, M. Covi, B. St. John, J.G. Nicula, and K.A. Anuar, 2018. Participatory GIS as a Tool for Stakeholder Engagement in Building Resilience to Sea Level Rise: A Demonstration Project, *Marine Technology Society Journal*, 52: 45-55.