IUPUI
SCHOOL OF INFORMATICS AND COMPUTING
Department of Human-Centered Computing

INFO-P 502 Modeling Crisis (Section 33579)
INFO-I 400 Modeling Crisis (Section 35619)

Spring 2023

Credit Hours:	3
First class:	Class materials for the first module will be available on Wednesday, January 11, 2023
Instructor:	Kevin Mickey
Office Hours:	Fridays, from 10–11 a.m., Eastern, and by arrangement
Contact:	kmickey@iu.edu
Prerequisites:	None. However, SPEA-J 520 Mapping and Analysis for Public Safety, GEOG-G 538 Geographic Information Systems, or equivalent experience is recommended.
Instruction mode:	Online

COURSE PARTICIPATION GUIDELINE

Enrollment in this course is restricted to students who have U.S. citizenship, permanent residency, or a valid U.S. visa.

COURSE DESCRIPTION

Models employed by geographic information systems characterize the physical, economic, social, and environmental impact of natural and human caused disasters. This course surveys geospatial models and their capabilities and technologies. Students learn to use models for disaster mitigation, preparedness, and response. The course prepares students for research on modeling crisis.

Topic: This course focuses on modeling natural disasters.

READINGS AND RESOURCES

Required readings are listed in the course Canvas modules. Readings are available via the Internet, Canvas, or university databases, such as the IUPUI Main Library database A–Z. No textbook purchase is required.

Student should already have mastered basic technology skills (e.g., logging on to a PC or Mac, performing system functions as a user, navigating with a web browser, using MS Office). For students lacking entry skills, existing online resources can be valuable. IUPUI provides access to excellent online tutorials. Self-instructional modules on basic technology skills are recommended for course assignments, exercises, and projects. These may be found at UITS IT Training, IU Partners, and Skillsoft.

LEARNING OUTCOMES

Upon completion of this course, students will	RBT	PGPL	Assessment
1. Apply geospatial visualization and analysis techniques to generate maps and analysis output related to hazard risk and vulnerability.	3	1, 3	Assignment 1
2. Design and create building exposure data suitable for risk analysis.	6	2, 3	Assignment 2
3. Compare and contrast methods for designing and creating exposure data suitable for risk analysis.	5	2	Exam 1
4. Evaluate geospatial technology methods for displaying and analyzing data.	5	1, 2	Exam 1
5. Evaluate trends in applying geospatial technologies to delineate hazards.	5	2	Reading and Discussion 1
6. Develop examples of geospatial hazard data.	3	1	Assignment 3
7. Compare and contrast geospatial tools and methods for hazard delineation.	5	1, 2	Exam 2
8. Evaluate trends in assessing physical, economic, and social risk using geospatial tools and methods.	5	1, 2	Reading and Discussion 2
9. Analyze physical, economic, and social risk related to various hazards using GIS models.	4	1, 2	Assignment 3
10. Evaluate the relative effectiveness of visualizations, such as dashboards, maps, charts, 3D graphics, and animation for communicating to a given audience.	5	1, 3	Reading and Discussion 3
11. Compare and contrast geospatial tools and methods for analyzing physical, economic, and social risk from hazards.	5	1, 2	Exam 3
12. Differentiate geospatial technology options for visualizing and communicating risk.	5	1, 2	Exam 3

Revised Bloom's Taxonomy (RBT)

1. N/A; 2. N/A; 3. Apply; 5. Analyze; 5. Evaluate; 6. Create

Principles of Graduate and Professional Learning (PGPL)

1. Demonstrating mastery of the knowledge and skills expected for the degree and for professionalism and success in the field
2. Thinking critically, applying good judgment in professional and personal situations
3. Communicating effectively to others in the field and to the public
4. Behaving in an ethical way both professionally and personally

ASSESSMENTS

1. Exams (15% each × 3)	45%
2. Readings and Discussions (8⅓% each × 3)	25%
3. Assignments (10% each × 3)	30%

Grading Scale:		**Graduate**	**Undergraduate**
A+	97 – 100	Instructor's discretion	Instructor's discretion
A	93 – 100	Excellent	Excellent
A–	90 – 92.99	"	"
B+	87 – 89.99	Good	Good
B	83 – 86.99	"	"
B–	80 – 82.99	Marginally acceptable	"
C+	77 – 79.99	No credit given	Acceptable
C	73 – 76.99	"	"
C–	70 – 72.99	"	Marginally acceptable
D+	67 – 69.99	"	No credit given
D	63 – 66.99	"	"
D–	60 – 62.99	"	"
F	Below 60	"	"

Graduate students: No grade below B– will be counted toward degree requirements, and the course must be repeated for credit. Grades below B may result in an overall grade point average below 3.0 and possible dismissal from the program.
Undergraduate students: No grade below C– will be counted toward degree requirements, and the course must be repeated for credit. Grades below C– may result in an overall grade point average below 2.0 and possible dismissal from the program.

FREQUENTLY ASKED QUESTIONS

Q: Are there required meetings?

A: All course lectures and activities are accessible via Canvas. Course activities must be completed by accessing an assigned computer. The computer may be accessed virtually and in person. It is in room IT 257 of the School of Informatics and Computing Building located at 535 West Michigan Street, Indianapolis, Indiana 46202. The room is reserved for this class on Fridays from 10 a.m. to 4 p.m., Eastern. However, your use of the lab computer during this time is optional. The lab is also accessible to other students, staff, and faculty outside of these times, so it is in your best interest to complete assignments during the dedicated lab time and well ahead of the due date to ensure you have access to a lab computer when needed. The instructor will be available for an optional question and answer session on Fridays, except during Spring break, 10–11 a.m. on by appointment.

Q: Is there any programming in this course?

A: No, there are no programming elements in this course. However, you will complete hands-on activities using GIS software and a FEMA modeling tool that assesses the economic, social, and physical impact of several types of natural hazards. The knowledge you learn could be leveraged if you have developed programming skills in other courses.

Q: Will extensive writing be required?

A: No. Most of the writing in the course will be in graded discussions (a few paragraphs for each).

Attendance:

The course will be taught entirely online including web-based readings and resources, threaded discussions, online presentations, and activities.

This course assumes that students can work independently. There are no required face-to-face meetings. There are no required synchronous online meetings. However, students are encouraged to e-mail or arrange an online chat with the instructor at any time.

A basic requirement of this course is that you will participate in all class activities and conscientiously complete all required course assignments. Students are expected to complete the assignments, quizzes, and projects on time, which is your attendance.

Incomplete:

The instructor may assign an Incomplete (I) grade only if at least 75% of the required coursework has been completed at passing quality and holding you to previously established time limits would result in unjust hardship to you. All unfinished work must be completed by the date set by the instructor. Left unchanged, an Incomplete automatically becomes an F after one year. https://studentcentral.iupui.edu/grades-progress/incompletes.html

Deliverables:

You are responsible for completing each deliverable (e.g., assignment, exam) by its deadline and submitting it by the specified method. Deadlines are outlined in the syllabus or in supplementary documents accessible through Canvas. In fairness to the instructor and students who completed their work on time, a grade on a deliverable shall be reduced 10% if it is submitted late and a further 10% for each 24-hour period it is submitted after the deadline.

Canvas

This course employs resources that can be accessed through the IU Canvas site (canvas.iu.edu) starting the first day of class. You will need your IU username and password to log into the Canvas learning management system. Students having login problems may contact the IU Support Center at 317 274-4357, 812 855-6789, and ithelp@iu.edu.

SCHEDULE

Week	**Topic**
Week 1	**Wednesday, January 11, 2023** • Topic: Introduction Assigned: • Student introductions
Week 2	**Wednesday, January 18, 2023** • Topic: Overview of the Components of Crisis Management and the Role of Geospatial Technologies and GIS Fundamentals Part I Assigned: • Practice Activity: Review of GIS Tools I Due: • Student introductions
Week 3	**Wednesday, January 25, 2023** • Topic: GIS Fundamentals Part II Assigned: • Practice Activity: Review of GIS Tools II • Assignment 1: GIS Skills
Week 4	**Wednesday, February 1, 2023** • Topic: Spatial Data Requirements Assigned:

Week	Topic
	• Practice Activity: Exploring Emergency Management Data and Resources
Week 5	**Wednesday, February 8, 2023** • Topic: Spatial Data Development Strategies Assigned: • Practice Activity: Developing and improving data – strategies and tools • Assignment 2: Data Development Due: • Assignment 1: GIS Skills
Week 6	**Wednesday, February 15, 2023** • Topic: Modeling Hazards – Considerations and Strategies **Exam 1 Open from Friday, February 17, 12:01 AM through Sunday, February 19 11:59 PM** (Open note exam covering weeks 1 through 5)
Week 7	**Wednesday, February 22, 2023** • Topic: Hazard Mapping – Earthquake Hazard Fundamentals and How GIS is Used to Model Them Assigned: • Practice Activity: Earthquake and Tsunami Modeling Due: • Assignment 2: Data Development
Week 8	**Wednesday, March 1, 2023** • Topic: Hazard Mapping – Flood Hazard Fundamentals and How GIS is Used to Model Them Assigned: • Practice Activity: Flood Modeling • Reading and Discussion 1 INSERT READING
Week 9	**Wednesday, March 8, 2023** • Topic: Hazard Mapping – Hurricane Hazard Fundamentals and how GIS is used to Model Them

Week	Topic
	Assigned: • Practice Activity: Hurricane Modeling
March 13-19	Spring Break – No class
Week 10	**Wednesday, March 22, 2023** • Topic: Hazard Mapping – Other Hazards Assigned: • Practice Activity: Other Hazard Modeling Tools Due: • Reading and Discussion 1
Week 11	**Wednesday, March 29, 2023** • Topic: Risk and Vulnerability Analysis: Assessing Impacts to the Built Environment Assigned: • Practice Activity: Modeling Physical Impacts **Exam 2 Open from Friday, March 31, 12:01 AM through Sunday, April 2 11:59 PM** (Open note exam covering weeks 6 through 10)
Week 12	**Wednesday, April 5, 2023** • Topic: Risk and Vulnerability Analysis: Economic Impacts Assigned: • Practice Activity: Modeling Economic Impacts
Week 13	**Wednesday, April 12, 2023** • Topic: Risk and Vulnerability Analysis: Social Impacts Assigned: • Practice Activity: Assessing Social Impacts • Reading and Discussion 2 INSERT READING • Assignment 3: Risk and Vulnerability Analysis
Week 14	**Wednesday, April 19, 2023** • Topic: Visualizing Risk with GIS: 3D and Animation Assigned:

Week	Topic
	• Practice Activity: 3D and Animation in ArcGIS Pro • Reading and Discussion 3 INSERT READING Due: • Reading and Discussion 2
Week 15	**Wednesday, April 26, 2023** • Using Mobile and Web-Based GIS Tools for Communicating Geospatial Crisis Information Due: • Reading and Discussion 3 • Assignment 3: Risk and Vulnerability Analysis **Exam 3 - Open from Tuesday, May 2, 12:01 AM through Thursday, May 4, 11:59 PM** (Open note exam covering weeks 11 through 15)

CODE OF CONDUCT

All students should aspire to the highest standards of academic integrity. Using another student's work on an assignment, cheating on a test, not quoting or citing references correctly, or any other form of dishonesty or plagiarism shall result in a grade of zero on the item and possibly an F in the course. Incidences of academic misconduct shall be referred to the Department Chair and repeated violations shall result in dismissal from the program.

All students are responsible for reading, understanding, and applying the *Code of Student Rights, Responsibilities and Conduct* and in particular the section on academic misconduct. Refer to *The Code > Responsibilities > Academic Misconduct* at https://studentcode.iu.edu/. All students must also successfully complete the Indiana University Department of Education "How to Recognize Plagiarism" Tutorial and Test. https://plagiarism.iu.edu/ You must document the difference between your writing and that of others. Use quotation marks in addition to a citation, page number, and reference whenever writing someone else's words (e.g., following the *Publication Manual of the American Psychological Association*). To detect plagiarism, instructors apply a range of methods, including Turnitin.com. https://app.teaching.iu.edu/tools/turnitin

Academic Misconduct:

1. **Cheating:** Cheating is an attempt to use or provide unauthorized assistance, materials, information, or study aids in any form and in any academic exercise or environment.

a. A student must not use external assistance on any "in-class" or "take-home" examination, unless the instructor specifically has authorized external assistance. This prohibition includes, but is not limited to, the use of tutors, books, notes, calculators, computers, and wireless communication devices.

b. A student must not use another person as a substitute in the taking of an examination or quiz, nor allow other persons to conduct research or to prepare work, without advanced authorization from the instructor to whom the work is being submitted.

c. A student must not use materials from a commercial term paper company, files of papers prepared by other persons, or submit documents found on the Internet.

d. A student must not collaborate with other persons on a particular project and submit a copy of a written report that is represented explicitly or implicitly as the student's individual work.

e. A student must not use any unauthorized assistance in a laboratory, at a computer terminal, or on fieldwork.

f. A student must not steal examinations or other course materials, including but not limited to, physical copies and photographic or electronic images.

g. A student must not submit substantial portions of the same academic work for credit or honors more than once without permission of the instructor or program to whom the work is being submitted.

h. A student must not, without authorization, alter a grade or score in any way, nor alter answers on a returned exam or assignment for credit.

2. **Fabrication:** A student must not falsify or invent any information or data in an academic exercise including, but not limited to, records or reports, laboratory results, and citation to the sources of information.

3. **Plagiarism:** Plagiarism is defined as presenting someone else's work, including the work of other students, as one's own. Any ideas or materials taken from another source for either written or oral use must be fully acknowledged unless the information is common knowledge. What is considered "common knowledge" may differ from course to course.

    a. A student must not adopt or reproduce ideas, opinions, theories, formulas, graphics, or pictures of another person without acknowledgment.

    b. A student must give credit to the originality of others and acknowledge indebtedness whenever:

        1. directly quoting another person's actual words, whether oral or written;

        2. using another person's ideas, opinions, or theories;

3. paraphrasing the words, ideas, opinions, or theories of others, whether oral or written;
4. borrowing facts, statistics, or illustrative material; or
5. offering materials assembled or collected by others in the form of projects or collections without acknowledgment

4. **Interference:** A student must not steal, change, destroy, or impede another student's work, nor should the student unjustly attempt, through a bribe, a promise of favors or threats, to affect any student's grade or the evaluation of academic performance. Impeding another student's work includes, but is not limited to, the theft, defacement, or mutilation of resources to deprive others of the information they contain.
5. **Violation of Course Rules:** A student must not violate course rules established by a department, the course syllabus, verbal or written instructions, or the course materials that are rationally related to the content of the course or to the enhancement of the learning process in the course.
6. **Facilitating Academic Dishonesty:** A student must not intentionally or knowingly help or attempt to help another student to commit an act of academic misconduct, nor allow another student to use his or her work or resources to commit an act of misconduct.

OTHER POLICIES

1. **Administrative withdrawal:** Students must participate in all class discussions and conscientiously complete all required course activities and/or assignments. If a student is unable to attend, participate in, or complete an assignment on time, the student must inform the instructor. If a student misses more than half of the required activities within the first 25% of the course without contacting the instructor, the student may be administratively withdrawn from this course. Administrative withdrawal may have academic, financial, and financial aid implications. Administrative withdrawal occurs after the full refund period, and a student who has been administratively withdrawn is ineligible for a tuition refund.
2. **Civility:** To maintain an effective and inclusive learning environment, it is important to be an attentive and respectful participant in lectures, discussions, group work, and other classroom exercises. Thus, unnecessary disruptions should be avoided, such as ringing cell phones, engagement in private conversations, and other unrelated activities. Cell phones, media players, or any noisy devices should be turned off during a class. Texting, web surfing, and posting to social media are generally not permitted. Laptop use may be permitted if it is used for taking notes or conducting class activities. Students should check with the instructor about permissible devices in class. IUPUI nurtures and promotes "a campus climate that seeks, values, and cultivates diversity in all of its forms and that provides conditions necessary for all campus community members to feel welcomed, supported, included, and valued" (IUPUI Strategic Initiative 9). IUPUI prohibits "discrimination against anyone for reasons of race,

color, religion, national origin, sex, sexual orientation, marital status, age, disability, or veteran status" (Office of Equal Opportunity). Profanity or derogatory comments about the instructor, fellow students, invited speakers or other classroom visitors, or any members of the campus community shall not be tolerated. A violation of this rule shall result in a warning and, if the offense continues, possible disciplinary action.

3. **Communication:** For classroom-based courses, the instructor or teaching assistant should respond to emails within two Indiana University working days, which excludes weekends and holidays. If you need assistance at any point during the semester, you can contact your instructor by phone at 317.278.4929 through the course Canvas email or by emailing kmickey@iu.edu. Email is always the best option. One-on-one virtual meetings - or in person meetings - can be arranged at a mutually convenient time during the semester if you need assistance with understanding a topic, require help on an assignment. Do not wait until the 'last minute' before a submission is due to request a one-on-one virtual meeting.

4. **Conferences:** To present research at an academic conference as speaker is commendable and aligns with the educational and research mission of the school and university. However, instructors can only provide accommodations for absences if a student is presenting work, such as a paper or poster, or is supported by a school or campus-level scholarship. The student should request from the instructor accommodation for an absence as soon as possible upon paper, poster, or scholarship acceptance. In the request for accommodation for absence, the student should provide supporting documentation of acceptance as well as confirmation from their mentor or campus sponsor that the presentation is to meet a research, educational, or diversity objective. Permission is granted at the discretion of the instructor. Students should not expect an exception for nonacademic conferences or conferences at which the student is not presenting as speaker. Travel arrangements should not be made until the student has received permission from the instructor.

5. **Counseling and Psychological Services (CAPS):** Students seeking counseling or other psychological services should contact the CAPS office at 274-2548 or capsindy@iupui.edu. For more information visit https://capstraining.iupui.edu.

6. **Course evaluations:** Course evaluations provide vital information for improving the quality of courses and programs. Students are urged to complete one course and instructor evaluation for each section in which they are enrolled at the School of Informatics and Computing with the following exceptions: (a) The student has withdrawn from the course; (b) fewer than five students are enrolled in the section (in which case maintaining anonymity is difficult); and (c) the section is a laboratory that must be taken with a course having a different section number. Course evaluations are completed at https://soic.iupui.edu/app/course-eval/. Course evaluations are typically open from the eleventh week. Course evaluations are anonymous, which means that no one can view the name of the student completing the evaluation. In addition, no one can view the evaluation itself until after the instructor has submitted the final

grades. In small sections, demographic information should be left blank, if it could be used to identify the student.

7. **Disabilities policy:** All qualified students enrolled in this course are entitled to reasonable accommodations for a disability. Notify the instructor during the first week of class of accommodations needed. Students requiring accommodations register with Adaptive Educational Services (AES) and complete the appropriate AES-issued before receiving accommodations. The AES office is located at UC 100, Taylor Hall (Email: aes@iupui.edu, Tel. 317 274-3241). For more information visit http://aes.iupui.edu.
8. **Email:** Indiana University uses your IU email account as an official means of communication, and students should check it daily. Although you may have your IU email forwarded to an outside email account, please email faculty and staff from your IU email account.
9. **Emergency preparedness:** Know what to do in an emergency so that you can protect yourself and others. For more information, visit the emergency management website at https://protect.iu.edu/emergency-continuity/index.html.
10. **IUPUI course policies:** Several campus policies governing IUPUI courses may be found at the following link: http://registrar.iupui.edu/course_policies.html
11. **No class attendance without enrollment:** Only those who are officially enrolled in this course may attend class unless enrolled as an auditor or making up an Incomplete by prior arrangement with the instructor. This policy does not apply to those assisting a student with a documented disability, serving in an instructional role, or administrative personnel. http://registrar.iupui.edu/official-enrollment-class-attendance.html Children may *not* attend class with their parents, guardians, or childcare providers.
12. **Religious holidays:** Students seeking accommodation for religious observances must submit a request form to the course instructor by the end of the second week of the semester. For information visit https://diversity.iupui.edu/resources/IU%20Policies%20and%20Religious%20Accomodations.html
13. **Right to revise:** The instructor reserves the right to make changes to this syllabus as necessary and, in such an event, will notify students of the changes immediately.
14. **Sexual misconduct:** IU does not tolerate sexual harassment or violence. For more information and resources, visit http://stopsexualviolence.iu.edu/.
15. **Student advocate:** The Student Advocate assists students with personal, financial, and academic issues. The Student Advocate is in the Campus Center, Suite 350, and may also be contacted at 317 274-4431 or studvoc@iupui.edu. For more information visit - https://studentaffairs.iupui.edu/advocacy-resources/index.html.

MISSION STATEMENT

The Mission of IUPUI is to provide for its constituents excellence in

- Teaching and Learning;
- Research, Scholarship, and Creative Activity; and
- Civic Engagement.

With each of these core activities characterized by

- Collaboration within and across disciplines and with the community;
- A commitment to ensuring diversity; and
- Pursuit of best practices.

IUPUI's mission is derived from and aligned with the principal components—Communities of Learning, Responsibilities of Excellence, Accountability and Best Practices—of Indiana University's Strategic Directions Charter.

STATEMENT OF VALUES

IUPUI values the commitment of students to learning; of faculty to the highest standards of teaching, scholarship, and service; and of staff to the highest standards of service. IUPUI recognizes students as partners in learning. IUPUI values the opportunities afforded by its location in Indiana's capital city and is committed to serving the needs of its community. Thus, IUPUI students, faculty, and staff are involved in the community, both to provide educational programs and patient care and to apply learning to community needs through service. As a leader in fostering collaborative relationships, IUPUI values collegiality, cooperation, creativity, innovation, and entrepreneurship as well as honesty, integrity, and support for open inquiry and dissemination of findings. IUPUI is committed to the personal and professional development of its students, faculty, and staff and to continuous improvement of its programs and services.