27: 202: 605 Foundations in GIS for Crime Mapping and Public Safety
3 Credits
Fall 2024

Mondays
6:00-8:40 pm

I. Course Information

Instructor Information:

Instructor: Alejandro Giménez Santana, PhD
Classroom: ENG 309
Email: alejandro.gimenez@rutgers.edu
Office Hours: By appointment only
To schedule a meeting with me, please use this link: https://bit.ly/3esHAW9

Course Overview:

This course introduces the theory and practice of Geographic Information Systems (GIS) for public safety. Students will learn to create crime maps and analyze geographic crime data through hands-on exercises. The class presents the theories of "crime and place" and how contemporary spatial analysis techniques inform place-based crime prevention strategies, assist in problem-solving activities, and support the co-production of public safety. The course will include practical hands-on skills training, where students will be guided through GIS mapping and analysis tasks. Lectures and discussions will focus on the daily class topics, and each module will focus on ways to use GIS for mapping, spatial analysis, and multi-stakeholder decision-making for crime prevention and public safety.

This course may count towards an MA certificate, Spatial Analysis for Public Safety and Security.

Prerequisite:

This course assumes no previous experience in the use of GIS. The basic ability to use a desktop computer and Microsoft Word and Excel applications is required.

Course Learning Goals:

By the end of this course, students will be able to:

1. Develop the theoretical and practical skills necessary for studying crime in a geographic context.
2. Use computer-mapping software as a tool for examining crime – or other variables – in a variety of geographic settings.
3. Model geographic objects such as bounded areas (e.g., census tracts or service districts), specific locations (e.g., buildings or events such as crimes), and networks (e.g., streets).
4. Learn how to collect, manage, and edit spatial data (including administrative records and self-collected data) for use with GIS.
5. Explore data sources for understanding the geography of crime.
6. Understand how crime mapping is being used by law enforcement and other community stakeholders to make data-informed decisions and problem-solve crime issues.
7. Develop critical thinking skills for reviewing and interpreting final maps.

Required/Recommended Readings:

Harries, K. D. (1995). Mapping crime: Principle and practice. US Department of Justice, Office of Justice Programs, National Institute of Justice, Crime Mapping Research Center. (Recommended)

Piza, E. & Baughman, J. (2021). Modern Policing using ArcGIS Pro. Redlands, CA: Esri Press. (Recommended)

Course Requirements:

Students are **required** to read assigned readings before each class and be prepared for class discussions and assignments.

Course Structure:

Classroom learning is a group activity that depends upon everyone's full participation to succeed. Be prepared to begin class on time; silence or turn off and put away cell phones; read and be prepared to discuss homework; submit assignments on time; and assist fellow classmates.

This course heavily utilizes ESRI's ArcGIS Pro software. For your convenience, ArcGIS software is accessible at all computer labs on campus as well as the virtual computer lab. Detailed instructions will be provided on how to download and install a free copy to your computer. Rutgers University offers a free educational license for this software.

Datasets will be provided as needed. Please note that datasets used in this course should not be shared or otherwise distributed to people outside of the course without written permission from the instructor. Datasets, assignments, grades, and other information is posted on Canvas.

Note for Mac OS users:
Most ESRI desktop products, specifically ArcGIS Pro, are not compatible with the Mac OS. As an alternative, please use the Rutgers Virtual Computer Lab: https://it.rutgers.edu/virtual-computer-labs/

If you want to use your Mac, you need to install Windows concurrently on your Mac while running the Boot Camp software. More Information about Boot Camp can be found here: https://support.apple.com/boot-camp.

II. Course Schedule (tentative):

Date	Class Topic	Required Readings	Assignments Due
Week 1 9/9	Review of syllabus Introduction to Crime Mapping and ArcGIS Pro	Activate and install ArcGIS Pro (https://software.rutgers.edu/product/3663) – only compatible with Windows	
Week 2 9/16	What is GIS? Vector and raster Data Spatial Analytics applied to crime analysis ArcGIS, QGIS, and other GIS-capable software	Ch. 1 Harries, K. D. (1995) "The law of crime concentration and criminology of place" - Weisburd	
Week 3 9/23	GIS-Friendly datasets Data sources Importing data to GIS CompStat Applications of GIS in Criminal Justice	"*Data is the New Black*" – Ferguson	**Lab 1 Due**
Week 4 9/30	Map Symbology Querying GIS Data Labeling Features	Ch. 2 - Harries, K. D. (1995) *"Translational criminology"* – Laub & Frisch	

Week 5 10/7	Create and export final maps Working with the Layout View Map Layout & Design Elements Inserting Maps into Word & PPT	Ch. 3 Harries, K. D. (1995)	**Lab 2 Due**
Week 6 10/14	**"Everything is related to everything else, but near things are more related than distant things."** – Tobler, W. R. Querying GIS data Map Projections What is a coordinate system? Downloading Census Shapefiles	Ch. 4 Harries, K. D. (1995) "Geographic area and map projections" – Tobler, W. R.	
Week 7 10/21	Joining Tables Spatial Joins Aggregating point data	"Bringing the physical environment back into neighborhood (…)" – Drawve et al.	**Article Review 1**
Week 8 10/28	Geocoding Addresses Displaying XY coordinates Adding XY Centroids to Points, Polygons or Lines	"The role of neighborhood parks as crime generators" – Groff et al.	**Lab 3 Due**
Week 9 11/4	Geoprocessing tools Buffers Geoprocessing Tools Spatial Data Processing Tools (Dissolve, Clip, etc.) Symbolizing Buffers	"Reducing crime through environmental design"– Chalfin et al.	
Week 10 11/11	CRIME ANALYSIS 1 Raster Data Analysis and Mapping Density Raster Mapping (Hot Spot Analysis) Symbolizing Raster Density Maps	"The utility of hotspot mapping for predicting spatial patterns of crime" – Chainey et al.	**Article Review 2**
Week 11 11/18	CRIME ANALYSIS 2 Tracking crime in target areas	*"Nonresidential crime attractors and generators elevate perceived neighborhood crime and incivilities"* – McCord et al.	
Week 12 11/25	Mapping the social environment GIS and census data	*"Community-Research-Practice Partnership in Rainier Beach, Seattle"* – Gill et al.	**Lab 4 Due**
Week 13 12/2	Data-Informed Community Engagement Newark Public Safety Collaborative Place-based analysis	*"Data-Informed Community Engagement: The Newark Public Safety Collaborative"* – Gimenez-Santana et al.	

	Week 14		

Week 14		
12/9	Class presentations	
Week 15	**NO CLASS** **FINAL PROJECT DUE 12/16**	
12/16		

III. Course Assessment and Grading

The final grade will be assessed based upon your performance on the following:

Assignment Description	% of Course grade
Assignment #1 Term Project	40%
Assignment #2 Article Reviews	20%
Assignment #3 Lab Assignments	20%
Assignment #4 Class Presentation	10%
Assignment #5 Classroom Attendance and Participation	10%

TERM PROJECT (40%): This project is intended to measure your applied understanding of the major skills and concepts presented in class—in a format that is less structured than lab assignments. Your term paper will count 40 points (40%) towards your final grade.

   a. **Think of at least two related spatial questions** (in any topic of interest to you) that are spatial in nature and that can be answered using a GIS. For example, "Are sex offenders mostly men?" is NOT a spatial question; "How are sex offenses *distributed* throughout a jurisdiction?" IS a spatial question. *Example spatial questions:*
      - *Does the location of toxic waste sites overlap with poorer communities?*
      - *How are crimes distributed or clustered in the jurisdiction?*
      - *Can police districts be re-drawn in a better way?*
   b. **Find (or create) all necessary datasets/shapefiles** to use in a GIS to answer your questions. Use base layers as appropriate.
   c. **Produce several final maps** using sound cartographic principles.
   d. **Produce a final paper** that discusses the research questions, methods, and results in a way that would allow anyone with basic GIS skills to replicate your analysis. It should be submitted in (color) PDF or Word format on Canvas by the due date listed on the class schedule.

ARTICLE REVIEWS (20%): Two article reviews are due during the semester. Each article review will count 10 points (10%) towards your final grade. Examples of what is expected are provided on Canvas. Articles must be from peer-reviewed journals, include a data/methods/results section, and have a spatial component to the analyses.
   - Article Review 1: Specific crime type using spatial analysis technique
   - Article Review 2: Specific crime generator/attractor article

LAB ASSIGNEMENTS (20%): Labs will require you to demonstrate a combination of analytical and technical skills. These will include various practical exercises demonstrating your use of GIS software. There will be four (4) lab assignments throughout the semester. Each lab assignment will count 5 points (5%) towards your final grade. **All labs must be uploaded on Canvas before the beginning of class on the day on which they are due. If you do not submit labs on time, you will get a zero**. Each lab assignment will be graded objectively.

CLASS PRESENTATION (10%): Give a PowerPoint presentation, with no more than 10 slides (number your slides), of your Term Project. You will have <u>15 minutes</u> to present your project to the class. The presentation is an opportunity for everyone to learn about applying GIS to unique topic areas and for you to get constructive feedback. Your term paper presentation will count 10 points (10%) towards your final grade.

Your term paper presentation should include:
1. An *introduction*
2. *Literature review* (e.g., Authors A, B, and C have found that GIS is useful for explaining the distribution of crime and informing police operations)
3. What are your *research questions*? Explain why GIS is required to answer them. Where did you get your data? Was cleaning and/or manipulating the data required? How was ArcGIS Pro used to produce your maps? Discuss the steps necessary to re-produce your maps.
   a. For each map, discuss:
      i. The result/information that you intend the map to communicate (i.e., What should the map communicate to the reader? What is the map's intended purpose?);
      ii. Your interpretation of the map.
4. A *conclusion* with brief answers to your research questions. Every final map that you produce should have a clear purpose—specifically, to help communicate answers to your questions. Map images, titles and other design elements should clearly communicate the intended information to the reader. Your commentary should supplement that.

You will be graded, in part, on how clearly and effectively the maps support your conclusions, communicate their intended information, and fulfill their intended purposes.

ATTENDANCE and PARTICIPATION (10%): Attendance is VERY IMPORTANT and may count toward your final grade. You will be more successful if you attend. Your participation and attendance will count 10 points (10%) towards your final grade.

The following grading scale will be used for this course:

A	90–100%
B+	87-89%
B	80-86%
C+	77-79%
C	70-76%
D	60-69%
F	<60%

Self-Reporting Class Absence

All class absences should be reported through the Rutgers Self-Reporting Absence system (https://sims.rutgers.edu/ssra). Reporting your absence does not "excuse" you. It notifies your instructors, a courtesy that provides an opportunity for you to contact your instructor directly about missed work.

Late or Missing Assignment Policy

You are not allowed to plagiarize (copy) other students' assignments. If found to have copied, both students will receive an F grade, and your conduct will be reported. Make-up exams and late assignments will be allowed only in extenuating circumstances and with prior approval of the instructor. This means to contact me ahead of time. In the case of an emergency or an unavoidable absence, I expect you to contact me as soon as possible and provide written documentation once you have returned. It is YOUR RESPONSIBILITY to catch up.

IV. **COURSE POLICIES AND STUDENT RESOURCES**

Classroom rules

All members of this class are required to conduct themselves in an appropriate and professional manner. In this class, we may have discussions that challenge our taken for granted assumptions about crime and justice. Students should be prepared to engage honestly and openly about this material and perhaps even examine their own beliefs about these issues. While I am hopeful that the course materials will spark interesting discussion, personal insults or other types of demeaning, disrespectful, or threatening comments toward other class members about their experiences, backgrounds, or statements will NOT be tolerated.

Health and Safety @RU-N

In order to protect the health and wellbeing of all members of the Rutgers-Newark community, masks must be worn by all persons inside campus buildings when in the presence of others, and in buildings in non-private enclosed settings (e.g., common workspaces, workstations, meeting rooms, classrooms, etc.). Masks should securely cover the nose and mouth.

Masks must be worn during class meetings. Each day before you arrive on campus or leave your residence hall, you must complete the brief survey on the My Campus Pass symptom checker self-screening app found at: myRutgers Portal.

Academic Integrity

As a member of the Rutgers University community, you are not to engage in any academic dishonesty. You are responsible for adhering to basic academic standards of honesty and integrity as outlined in the Rutgers University Policy on Academic Integrity for Undergraduate and Graduate Students http://studentconduct.rutgers.edu/academic-integrity. Your academic work should be the result of your own individual effort, you should not allow other students to use your work, and you are required to recognize and reference any material that is not your own. Violations of the university's policy will result in appropriate action.

Accommodation and Support Statement

Rutgers University Newark (RU-N) is committed to the creation of an inclusive and safe learning environment for all students and the University as a whole. RU-N has identified the following resources to further the mission of access and support:

For Individuals Experiencing Disability: The Office of Disability Services (ODS) works with students with medical, physical, and/or mental conditions who encounter disabling barriers in order to determine reasonable and appropriate accommodations for access. Students who have completed the process with ODS and have approved accommodations are provided a Letter of Accommodation (LOA) specific to each course. To initiate accommodations for their course students must both provide the LOA to and have a conversation with the course instructor about the accommodations. This should occur as early in the semester as possible. More information can be found at the RU-N ODS website (ods.newark.rutgers.edu). Contact ODS at (973) 353-5375 or via email at ods@newark.rutgers.edu.

For Individuals who are Pregnant: The Office of Title IX and ADA Compliance is available to assist with any concerns or potential accommodations related to pregnancy. Students may contact the Office of Title IX and ADA Compliance at (973) 353-5063 or via email at TitleIX@newark.rutgers.edu.

For Short-term Absence Verification: The Office of the Dean of Students can provide assistance for absences related to religious observance, emergency or unavoidable conflict (illness, personal or family emergency, etc.). Students should refer to University Policy 10.2.7 Students requesting a letter of verification should submit information using the following link: https://go.rutgers.edu/Verification.

For Individuals with temporary conditions/injuries: The Office of the Dean of Students can assist students who are experiencing a temporary condition or injury (broken or sprained limbs, concussions, or recovery from surgery). Students experiencing a temporary condition or injury should submit a request using the following link: https://temporaryconditions.rutgers.edu.

For Gender or Sex-Based Discrimination or Harassment: The Office of Title IX and ADA Compliance can assist students who are experiencing any form of gender or sex-based discrimination or harassment, including sexual assault, sexual harassment, relationship violence, or stalking. Students can report an incident to the Office of Title IX and ADA Compliance by calling (973) 353-1906 or emailing TitleIX@newark.rutgers.edu. Incidents may also be reported by using the following link: https://go.rutgers.edu/RUNReportingForm.

For support related to Interpersonal Violence: The Office for Violence Prevention and Victim Assistance (VPVA) can provide any student with confidential support. The office does **not** have a reporting obligation to Title IX. Students can contact the office by calling (973) 353-1918 or emailing run.vpva@rutgers.edu. There is also a confidential text-based helpline available to students; students can text (973) 339-0734 for support. Students do not need to be a victim/survivor of violence; any student can receive services, information and support.

For Crisis and Concerns: The Campus Awareness Response and Education (CARE) Team works with students in crisis to develop a plan of support plan and address personal situations that might impact their academic performance. Connect with the CARE Team by using the following link: https://go.rutgers.edu/RUNReportingForm or emailing careteam@newark.rutgers.edu.

For Psychological Support (Stress, Mood, Family Issues, Substance Use concerns and other personal challenges): The Rutgers University-Newark Counseling Center provides individual therapy and support groups for students dealing with psychological issues. To schedule an appointment, email counseling@newark.rutgers.edu or call (973) 353-5805. Additional support is available through Uwill services:

- Uhelp: Crisis support at 833-646-1526 (available 24/7/365).
- Urise: Wellness-based video collection with a free account.
- Umatch: Teletherapy with flexible scheduling, starting with a free account.

Access Uwill@RUN at https://my.rutgers.edu using your netid. Services are confidential and free.

For emergencies, call 911 or Rutgers University Police Department at (973) 353-5111.