ESCI 6000 / GEOG 6005 / GEOG 8005 / INES 8090
URBAN HEAT ISLANDS
SPRING 2024

Instructor: Dr. Matthew Eastin
mdeastin@charlotte.edu

Class Time: Monday / Wednesday at 4:00 – 5:15 pm
Class Location: McEniry 118

Office: McEniry 209
Office Hours: Monday / Wednesday 9-10 am and 1-2 pm

Teaching Assistant: None

Text (Required): **Heat Islands: Understanding and Mitigating Heat in Urban Areas**
Lisa Gartland
Earthscan Publishing
ISBN: 978-1849712989

Text (Supplemental): **Urban Meteorology: Forecasting, Monitoring, and Meeting User Needs**
National Research Council
National Academies Press
ISBN: 978-0309252171

Course Description: An overview of urban heat islands (UHIs), including their defining characteristics, spatiotemporal evolution, sources/sinks, observing techniques, numerical simulation, mitigation efforts, and socioeconomic impacts. The course will entail a combination of lecture, literature review, and independent research projects through which students will analyze some aspect of the Charlotte UHI.

Course Student Learning Objectives (SLOs):

1. Gain a basic physical understanding of urban heat islands and their societal impacts.
2. Conduct a detailed literature review on some aspect of urban heat islands.
3. Complete an independent research project analyzing some aspect of urban heat islands.

Course Policies:

Attendance and Participation: Attendance is essential to maintaining an effective learning environment. Regular class attendance and participation are expected. Attendance will be taken twice each class – five minutes after the start of class and five minutes before the end of class. You must be present both times to earn attendance credit for any given class day. **The use of smart phones, email, music players, headphones, earbuds, or any form of social media during class is strictly prohibited.**

Assignment Deadlines and Extra Credit: You are expected to turn in assignments as scheduled, except due to extraordinary circumstances or participation in a college-sanctioned event. Late assignments will not be accepted. There will be ***no extra credit***.

Course Etiquette: Open and mutually respectful communication of varied opinions, beliefs, and perspectives during classroom or online discussion encourages the free exchange of ideas that is essential to higher learning and to the ability to learn from each other. Students are expected to display tolerance for others' views and refrain from the use of any inappropriate language. Unwelcome conduct directed toward another person based upon that person's actual or perceived race, gender, color, religion, age, national origin, ethnicity, disability, or veteran status, or for any other reason, may constitute a violation of University Policy 406, The Code of Student Responsibility. Any student suspected of engaging in such conduct will be referred to the Office of Student Conduct.

Accommodation: Students seeking disability accommodation must first consult the Office of Disability Services and follow the instructions of that office for obtaining accommodation.

Academic Integrity: Students are responsible for knowing and following the UNCC Code of Student Academic Integrity https://legal.charlotte.edu/policies/up-407 and the UNCC Code of Student Responsibility https://legal.charlotte.edu/policies/up-406 in all aspects of their work in this course. This code forbids cheating, fabrication or falsification of information, multiple submissions of academic work, plagiarism, abuse of academic materials, and complicity of academic dishonesty. Standards of academic integrity will be enforced in the course.

Course Requirements:

Attendance and Participation: Attendance is essential to maintaining an effective learning environment. Regular class attendance and active participation (i.e., take notes, ask questions, analyze data) is expected. During any virtual classes, active participation requires your virtual classroom camera to be "on" throughout the period. Use of smart phones, email, and texting during class is strictly prohibited.

Independent Research Project: Each student will develop and conduct a research project on some aspect of the Charlotte (NC) urban heat island. ***First***, each student will identify a specific topic based on interest and project feasibility within the semester-long time frame. ***Second***, a detailed literature review (involving at least 10 relevant peer-reviewed publications) will be conducted. ***Third***, based on the literature review, a set of open questions and/or hypotheses will be developed within the context of the Charlotte urban heat island. ***Fourth***, data acquisition and analysis will be conducted with the goal of answering the questions and/or testing the hypotheses. This step will undoubtedly involve some combination of computer coding, spreadsheet analysis, statistical testing, and/or geospatial database development. ***Fifth***, results will be summarized via an oral presentation and a written report. Regular individual meetings with the instructor will help guide the entire research process.

Evaluation:

Your final grade will be calculated using the following point distribution and standard percentile scale:

Attendance and Participation	20
UHI Topic Selection	10
Literature Review Synopsis	20
Questions / Hypotheses	10
Oral Presentation	20
Written Report	20
Total Points	100

Percent	Grade
90-100	A
80-89	B
70-79	C

Tentative Class Schedule:

Week	Date		Subject	Reading
1	Mon	1/08	**No Class – Winter Break**	
	Wed	1/10	Introduction to the Course	Eastin et al. (2018)
2	Mon	1/15	**No Class – MLK Day**	
	Wed	1/17	Discussion – UHI Structure and Variability	Chapters 1-3
3	Mon	1/22	Discussion – Observing UHIs	
	Wed	1/24	Discussion – Causes of UHIs	
4	Mon	1/29	Discussion – UHI Temporal Evolution	
	Wed	1/31	Discussion – UHI Simulation	
5	Mon	2/05	Discussion – UHI Impacts	Chapters 8-9
	Wed	2/07	Discussion – UHI Impacts	
6	Mon	2/12	Discussion – UHI Mitigation	Chapters 4-7
	Wed	2/14	Discussion – UHI Mitigation	
7	Mon	2/19	***Guest Speaker(s)***	
	Wed	2/21	***Guest Speaker(s)***	
8	Mon	2/26	Work on Project – **Topic Selection Due**	
	Wed	2/28	Work on Project	
9	Mon	3/04	**No Class – Spring Break**	
	Wed	3/06	**No Class – Spring Break**	
10	Mon	3/11	Work on Project	
	Wed	3/13	Work on Project	
11	Mon	3/18	Work on Project – **Literature Review Due**	
	Wed	3/20	Work on Project	
12	Mon	3/25	Work on Project – **Questions / Hypotheses Due**	
	Wed	3/27	Work on Project	
13	Mon	4/01	Work on Project	
	Wed	4/03	Work on Project	
14	Mon	4/08	Work on Project	
	Wed	4/10	Work on Project	
15	Mon	4/15	Work on Project	
	Wed	4/17	Work on Project	
16	Mon	4/22	**Oral Presentations**	
	Wed	4/24	**Oral Presentations**	
17	Mon	4/29	**Oral Presentations**	
	Wed	5/01	**No Class – Reading Day**	
18	Wed	5/08	**Written Report Due (at 5:00 pm)**	