URP 6445: Planning for Climate Change

Course Overview

Instructor: Dr. Zhong-Ren Peng
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Term: Fall 2025
Credit: 3
Class Location: FAC 0208
Meeting Time: W | Period 6 (15:50 – 1:40 PM) & F | Period 3 – 4 (9:35 – 11:30 AM)
Office Hours: Wednesday 2:00 – 4:00 PM, or by appointment to schedule a Zoom meeting

Required Text:

- There is no required textbook for this course.
- Mandatory readings are assigned weekly.
- Optional textbook: *Climate and Disaster Resilience in Cities*, 2011, Shaw and Sharma (Editors). Bingley, UK: Emerald Group Publishing Limited, ISBN: 978-0-85724-391-5.

Prerequisite Knowledge & Skills:

- None. Some basic knowledge and experience in GIS are preferred but not required.

Purpose of the Course:

- This course examines the relationship between human activities and climate change, focusing on how planning can mitigate and adapt to its effects. Specifically, it aims to deepen understanding of climate change science and scenarios, the impacts on built and natural environments, mitigation strategies, and adaptation planning approaches to foster resilient communities.

Course Goals & Objectives:

- By the end of the course, students will:
  - Understand the science and scenarios of climate change
  - Be able to analyze the impacts of climate change (vulnerability assessment)
  - Develop different adaptation measures for a study area
  - Estimate the costs and benefits of adaptation measures

Course Policies

Attendance Policy:

- Students are expected to attend all classes and to stay until the class ends. Role will be taken randomly; more than THREE unexcused absences will result in the loss of a letter grade.
- In the case of illness or a family emergency, a schedule for the completion of make-up work must be discussed with the instructor as soon as possible upon a student's return to class. Failure to comply with the agreed upon schedule will result in a failing grade for that project.

Grading Policies:

- Grading will be based on the following components:
  - **30%** – Assignments (six short essays) and class participation.
  - **30%** – Exam: Short-answer questions on primary topics covered by the course.
  - **40%** – Final project: A research report on a climate change relevant planning issue.
- Each assignment, exam, and final project will be first assigned point grades, and then converted into the letter grade based on the grade scale provided by the Registrar's Grade Policy regulations: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx.

Percentage or points earned in class	93 – 100	90 – 92.9	87 – 89.9	83 – 86.9	80 – 82.9	77 – 79.9	73 – 76.9	70 – 72.9	67 – 69.9	63 – 66.9	60 – 62.9	< 60
Letter grade equivalent	A	A–	B+	B	B–	C+	C	C–	D+	D	D–	F
Grade Points	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	0.67	0

Lateness & Make-up Policy:

- Students will be permitted a reasonable amount of time to make up the material or activities covered in their absence due to a true emergency, but the instructor must be informed of the legitimate absence ahead of time with proof.
- If WITHOUT the instructor's permission:
  - A half letter grade will be deducted if the project report is late for one day.
  - A full letter grade will be deducted if the project report is late for two days, and so on.
  - No assignment will be accepted if turned in after three days.

Assignment & Exam Policy:

- Students MUST follow the University's policy regarding unauthorized use of materials (i.e., cheating), prohibited collaboration, and the use of copyrighted materials.
- Students are responsible for reading and abiding by the University's student code of conduct (http://www.dso.ufl.edu/sccr/honorcodes/conductcode.php) and the University Honor Code.
- Under the Student 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'" (http://www.dso.ufl.edu/judicial/honorcode.php).

- Particularly, there are rules governing plagiarism and unauthorized collaboration. In this course, if you directly quote someone or use an idea from another source even if it is your own previously submitted work, you must attribute that idea or words. Failure to follow the rules regarding Integrity in Graduate School may result in a failure in this course and possible disciplinary action under the Judicial Process for Academic Honesty Violations.
- The following are some examples that are considered to be academic dishonesty:
  - Copying graphics or texts from any sources for your assignment or report without crediting the original source.
  - Representing someone else's work as your own.
  - Allowing someone else to represent your work as his/her own.
  - Multiple submissions of the same or similar work without prior approval.
  - Cheating in exams (e.g., looking at books or notes in a closed-book examination).
  - Falsifying information such as changing or leaving out data, such as manipulating or misreporting statistics for a research project; altering work after it has been submitted; hiding reference materials, etc.
- If you are unclear about what constitutes plagiarism or academic dishonesty, please make an appointment with me to discuss this.

Course Evaluations:

- Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals.
- Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/.
- Students will be notified when the evaluation period opens and can complete evaluations through the email that they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://bluera.com/ufl/. The survey is anonymous.
- Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

Special Note Regarding Advanced Automation Tools (e.g., ChatGPT)

- Students are expected to use technology in this class; technology can be as useful for writers as a calculator is for mathematicians. Some tools such as styles, automated cross-references, and spell check in Microsoft Word may already be familiar to you. Other tools, such as ChatGPT for summarizing articles, may be less familiar. These tools require understanding, practice, and quality-control.
- If students choose to utilize automated tools (e.g. artificial intelligence, learning tools like ChatGPT) the content and utilization must be appropriately cited. Further, these tools should not be used in a copy-paste fashion; at best, they can be attributed as a collaborator.

- All assignments, unless otherwise noted, must be completed individually – i.e. products of your own, unaided mind. Failure to properly use, cite, or collaborate with automation tools is a violation of academic honesty policies.
- All submissions are subject to plagiarism and aid checks.

UF Policies

University Policy on Accommodating Students with Disabilities:

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

University Policy on Academic Misconduct:

- UF students are bound by The Honor Pledge, which states, "We, the University of Florida community members, pledge to hold ourselves and our peers to the highest standards of honesty and integrity by abiding by the Honor Code."
- The Student Honor Code and Student Conduct Code specify a number of behaviors that violate this code and possible sanctions. Furthermore, you must report any condition that facilitates academic misconduct to the appropriate personnel.
- If you have any questions or concerns, please consult with the instructor or TAs in this class.

Netiquette & Communication Courtesy:

- All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats (http://teach.ufl.edu/docs/NetiquetteGuideforOnlineCourses.pdf).

Getting Help

Technical Difficulties:

- For issues with technical difficulties for E-learning, please contact the UF Help Desk at:
  - Learning-support@ufl.edu
  - (352) 392-HELP - select option 2
  - https://lss.at.ufl.edu/help.shtml
- Any requests for make-up due to technical issues MUST be accompanied by the ticket number received from LSS when the problem was reported to them. The ticket number will document the time and date of the problem. You MUST e-mail your instructor within 24 hours of the technical difficulty if you wish to request make-up.

- Other resources are available at http://www.distance.ufl.edu/getting-help for:
  - Counseling and Wellness resources
  - Disability resources
  - Resources for handling student concerns and complaints
  - Library Help Desk support
- Should you have any complaints with your experience in this course please visit http://www.distance.ufl.edu/student-complaints to submit a complaint.

The U Matter, We Care Initiative:

- Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need.
- If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575.
- The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Course Schedule & Assignments

Disclaimer:

- This syllabus represents my current plans and objectives.
- As we go through the semester, those plans may need to change to enhance the class learning opportunity or depend on guest speakers' availability. Such changes, communicated clearly, are not unusual and should be expected.

Date	**Fri., 8/22 & Wed., 8/27**
Topic	Course Overview, Sustainability and Resilience
Reading	1. IPCC (2023). *AR6 Synthesis Report: Climate Change 2023*. www.ipcc.ch/report/ar6/syr/ 2. EPA (2024). *Climate Change*. www.epa.gov/climate-change 3. Resilience and sustainability. (2019). *Nature Sustainability,* 2, 249. https://doi.org/10.1038/s41893-019-0284-4 4. Marchese et al. (2018). Resilience and sustainability: Similarities and differences in environmental management applications. *Science of The Total Environment*, *613–614*, 1275-1283. https://doi.org/10.1016/j.scitotenv.2017.09.086

	5. Matarrita-Cascante et al. (2022). Conceptualizing community resilience: Revisiting conceptual distinctions. In Community Development for Times of Crisis (1st ed., pp. 22). Routledge. https://doi.org/10.4324/9781003212652-4 6. Elmqvist et al. (2019). Sustainability and resilience for transformation in the urban century. *Nature Sus.*, *2*, 267–273. https://doi.org/10.1038/s41893-019-0250-1 7. Jones et al. (2021). Advancing resilience measurement. *Nature Sustainability*, *4*, 288–289. https://doi.org/10.1038/s41893-020-00642-x
Assignment #1	Write an essay to answer the following questions: • What is sustainability, and how can it be defined and quantified? • What is resilience, and how can it be defined and quantified? • What are the similarities and differences between sustainability and resilience? Requirements: Two pages and single-spaced (excluding references). At least five references are required. Due before class on *8/29*.
Note	• All written assignments of this course should be in essay format, not Q&A. • Your essay must include standard "Introduction," "Main Body," and "Conclusion" sections. However, within the essay, you must address all the assigned questions. • You may use ChatGPT to check grammar, but you are not allowed to use it to answer the questions. • The authenticity of your work will be professionally verified.

Date	**Fri., 8/29 & Wed., 9/3**
Topic	Physical Science Basis
Reading	1. IPCC (2023). *Climate Change 2023 Synthesis Report: Summary for Policymakers*. www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf 2. EPA (2024). *Climate Change Science*. www.epa.gov/climatechange-science 3. U.S. Global Change Research Program. (2009). *Climate Literacy: The Essential Principles of Climate Science*. www.globalchange.gov/reports/climate-literacy-essential-principles-climate-science 4. NOAA (2024). *Teaching Climate*. www.climate.gov/teaching
Assignment #2	Write an essay to answer the following questions: • What is climate change and climate variability? • What causes climate change (particularly, global warming & sea level rise)? • What is the basic science to explain climate change? • What are the main effects of climate change? Requirements: Two to three pages and single-spaced (excluding references). At least five references are required. Due before class on *9/10*.
Date	**Fri., 9/5 & Wed., 9/10**
Topic	Human Activities and Climate Change

Reading	1. IPCC (2019). *Special Report on Climate Change and Land: Summary for policymakers.* www.ipcc.ch/srccl/chapter/summary-for-policymakers/ 2. IPCC (2023). *Sixth Assessment Report. Chapter 6: Cities, settlements and key infrastructure*. www.ipcc.ch/report/ar6/wg2/chapter/chapter-6/ 3. Ewing et al. (2007). *Executive Summary. Growing Cooler: The Evidence on Urban Development and Climate Change*. Urban Land Institute. Chicago, IL. www.nrdc.org/sites/default/files/cit_07092401a.pdf 4. EPA (2023). *Climate Change Impacts on Freshwater Resources*. www.epa.gov/climateimpacts/climate-change-impacts-freshwater-resources 5. Urban et al. (2024). Interactions between climate change and urbanization will shape the future of biodiversity. *Nature Climate Change*, *14*, 436–447. https://doi.org/10.1038/s41558-024-01996-2
Assignment #3	Write an essay to answer the following questions: • How do human activities affect climate change? • What are climate change impacts on the built and natural environment? • Please provide evidence using detailed references. Requirements: Two to three pages and single-spaced (excluding references). At least five references are required. Due before class on *9/17*.

Date	**Fri., 9/12 & Wed., 9/17**
Topic	Climate Change Impacts and Vulnerability Assessment
Reading	1. IPCC (2022). *Climate Change 2022: Impacts, Adaptation and Vulnerability*. www.ipcc.ch/report/ar6/wg2/ 2. Bruun, P. (1988). The Bruun Rule of Erosion by Sea-Level Rise: A Discussion on Large-Scale Two- and Three-Dimensional Usages. *Journal of Coastal Research*, *4*(4), 627–648. www.jstor.org/stable/4297466 3. Nasiri et al. (2016). An overview to flood vulnerability assessment methods. *Sustainable Water Resources Management*, *2*, 331–336. https://doi.org/10.1007/s40899-016-0051-x 4. Adger et al. (2013). Cultural dimensions of climate change impacts and adaptation. *Nature Climate Change*, *3*, 112–117. https://doi.org/10.1038/nclimate1666 5. Nicholls, R. J., & Cazenave, A. (2010). Sea-level rise and its impact on coastal zones. *Science*, *328*, 1517-1520. https://doi.org/10.1126/science.1185782
Assignment #4	Write an essay to answer the following questions: • What is vulnerability? • How to define and quantify different aspects of vulnerability? • What is Bruun Rule of Erosion, and why is it controversial? Requirements: Two to three pages and single-spaced (excluding references). At least five references are required. Due before class on *9/24*.

Date	**Fri., 9/19 & Wed., 9/24**
Topic	Climate Change Mitigation Policies and Planning

Reading	1. IPCC (2022). *Climate Change 2022: Mitigation of Climate Change*. www.ipcc.ch/report/ar6/wg3/ 2. Deetjen et al. (2018). Review of climate action plans in 29 major U.S. cities: Comparing current policies to research recommendations. *Sustainable Cities and Society*, *41*, 711-727. https://doi.org/10.1016/j.scs.2018.06.023 3. Fekete et al. (2021). A review of successful climate change mitigation policies in major emitting economies and the potential of global replication. *Renewable and Sustainable Energy Reviews*, *137*, Article 110602. https://doi.org/10.1016/j.rser.2020.110602 4. Knutti et al. (2016). A scientific critique of the two-degree climate change target. *Nature Geoscience*, *9*, 13–18. https://doi.org/10.1038/ngeo2595
Assignment #5	Write an essay to answer the following questions: • What is climate change mitigation? • What is a climate action plan and what is the process of making a climate action plan? Requirements: Two to three pages and single-spaced (excluding references). At least five references are required. Due before class on *10/1*.

Date	**Fri., 9/26 & Wed. 10/1**
Topic	Climate Change Adaptation Policies and Planning
Reading	1. IPCC (2022). *Impacts, Adaptation and Vulnerability*. www.ipcc.ch/report/ar6/wg2/ 2. EPA (2024). *Climate Adaptation Plans*. www.epa.gov/climate-adaptation/climate-adaptation-plans 3. EPA (2023). *Planning for Climate Change Adaptation*. www.epa.gov/arc-x/planning-climate-change-adaptation 4. Shi, L., & Moser, S. (2021). Transformative climate adaptation in the United States: Trends and prospects. *Science*, *372*, Article eabc8054. https://doi.org/10.1126/science.abc8054 5. Woodruff, S., Stults, M. (2016). Numerous strategies but limited implementation guidance in US local adaptation plans. *Nature Clim Change*, 6, 796–802. https://doi.org/10.1038/nclimate3012 6. Grannis, J. (2011). *Adaptation tool kit: Sea level rise and coastal land use*. Georgetown Climate Center. www.georgetownclimate.org/files/report/Adaptation_Tool_Kit_SLR.pdf
Assignment #6	Write an essay to answer the following questions: • What is climate change adaptation? • What is the process of making a climate change adaptation plan? Requirements: Two to three pages and single-spaced (excluding references). At least five references are required. Due before class on *10/8*.

Date	**Fri., 10/3**
Exam	The exam will be in-class. Please bring your laptop.

Project	Begin developing your **project abstract**. Requirements: Two pages, single-spaced, detailing what project you plan to do, what problems to address, data and methodology, and expected results. Due before class on *10/10*.

Date	**Wed., 10/8**
Topic	Geoplan Sea Level Scenario Sketch Planning Tool (Guest Lecture #1)
Reading	1. University of Florida GeoPlan Center (2024). *Sea Level Scenario Sketch Planning Tool*. https://sls.geoplan.ufl.edu/

Date	**Fri., 10/10, and Wed., 10/15**
Topic	Local Adaptation to Climate Effects: Sea-Level Rise (Guest Lecture #2)
Reading	1. PLACE: SLR (n.d.). *Program for Local Adaptation to Climate Effects: Sea Level Rise*. https://placeslr.org/about/place-slr/
Project	• **Project abstract** due before class on 10/10. • Begin developing your project's **progress report**. Requirements: At least seven pages, single-spaced, excluding references. Progress Report due before class on *11/5*.

No Class on Wed., 10/22 and Fri., 10/24, Instructor at the ACSP conference

Date	**Wed., 10/29**
Topic	Transportation Resilience (Lecture & Guest Lecture #3)
Reading	1. FHWA (2017). *Vulnerability Assessment and Adaptation Framework, 3rd Edition*. www.fhwa.dot.gov/environment/sustainability/resilience/adaptation_framework/ 2. FDOT (2024). *Previous Plans: 2045 Florida Transportation Plan*. www.floridaftp.com/resources 3. EPA (2024). *Fast Facts on Transportation Greenhouse Gas Emissions*. www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions 4. Metroplan Orlando (2024). *2045 Metropolitan Transportation Plan*. https://metroplanorlando.gov/plans/metropolitan-transportation-plan/

Date	**Fri., 10/31**
Topic	Resilience in Miami-Dade County (Guest Lecture #4)
Reading	1. Miami-Dade County (2024). *Strengthening Resilience in Miami-Dade County*. www.miamidade.gov/global/economy/resilience/home.page 2. TBRPC (2023). *Resiliency Planning*. https://tbrpc.org/resiliency-planning/ 3. Wdowinski et al. (2016). Increasing flooding hazard in coastal communities due to rising sea level: Case study of Miami Beach, Florida. *Ocean & Coastal Management*, *126*, 1-8. https://doi.org/10.1016/j.ocecoaman.2016.03.002

Date	**Wed., 11/5**
Topic	Florida Resilience and Coastal Protection (Guest Lecture #5)
Reading	1. Florida Department of Environmental Protection (2024). *Office of Resilience and Coastal Protection Programs*. https://floridadep.gov/rcp
Project	Progress project report due before class today.

Date	**Fri., 11/7**
Topic	Economic Analysis of Adaptive Planning: Introduction to Input-Output model and Computable General Equilibrium Model
Reading	1. Hallegatte et al. (2011). The economics of climate change impacts and policy benefits at city scale: a conceptual framework. *Climatic Change* 104, 51–87. https://doi.org/10.1007/s10584-010-9976-5 2. Hsiang et al. (2017). Estimating economic damage from climate change in the U.S. *Science*, *356*(6345), 1362-1369. https://doi.org/10.1126/science.aal4369 3. EEA (2023). *Assessing the costs and benefits of climate change adaptation.* www.eea.europa.eu/publications/assesing-the-costs-and-benefits-of 4. Sovacool et al. (2015). The political economy of climate adaptation. *Nature Clim Change 5*, 616–618. https://doi.org/10.1038/nclimate2665 5. An, K., et al. (2023). How can computable general equilibrium models serve low-carbon policy? A systematic review. *Environmental Research Letters*, *18*, Article 033002. https://doi.org/10.1088/1748-9326/acbbe2

Date	**Wed., 11/12 & Fri., 11/14**
Topic	Climate Intervention
Reading	1. National Research Council. (2015). *Climate intervention: Carbon dioxide removal and reliable sequestration*. Washington, DC: The National Academies Press. https://doi.org/10.17226/18805 2. National Research Council. (2015). *Climate Intervention: Reflecting Sunlight to Cool Earth*. Washington, DC: The National Academies Press. https://doi.org/10.17226/18988. 3. Baum et al. (2024). Public perceptions and support of climate intervention technologies across the Global North and Global South. *Nat Commun 15*, 2060. https://doi.org/10.1038/s41467-024-46341-5

Date	**Wed., 11/19 & Fri., 11/21**
Topic	Final project presentation
Note	Happy Thanksgiving! (11/27)

Date	**Wed., 12/3**
Topic	Final project due