

CLIMATE CHANGE AND THE BUILT ENVIRONMENT

SRED 4930/6930

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Introduction

This survey course explores the basic tenets of climate change science as a foundation for further studies in the theories, models, and practices of sustainability, mitigation, resilience, and adaptation in the built environment. Through a critical reading and analysis of central bodies of literature, students are provided a conceptual and empirical basis for exploring applied practices and policies that are advanced in the name of climate change. As such, this course examines both decarbonization and responses to and preparations for climate impacts. The practice component of this course focuses on sustainability in building and site design; community resilience in urban planning; engineering resilience in buildings and infrastructure; ecological resilience in environmental management; multi-hazard risk assessment in disaster risk management; and adaptation processes in the public and private sectors that drive the construction, financing, and management of the built environment. Concepts and methods are explored through a variety of interdisciplinary practices ranging from coastal planning to asset management. Students will develop a critical understanding of relevant public policies and institutions, design and engineering techniques, economic strategies, and planning models. While there are no prerequisites for this course, some interest and general familiarity with environmental studies is useful. This course is intended to serve as an advanced elective for undergraduates and an introductory elective for graduate students in real estate, architecture, design, historic preservation, public policy, environmental studies, urban studies and liberal arts.

Format

This course is taught through weekly lectures. Lectures are held on Tuesdays and Thursdays from 12:30 p.m. to 1:45 p.m. (central time) in Newcomb Hall Room #2. As may be needed, some lectures may be held on Zoom.

Central Objectives

- Develop a literacy in climate change science.
- Develop a comprehensive understanding of how climate-attributed phenomena shape and impact the built environment.

- Develop a working understanding of the conceptual and theoretical foundations of sustainability science and adaptation science.
- Develop analytical sophistication in evaluating and applying the various tactics and strategies of sustainability, mitigation and adaptation.
- Develop a critical perspective on decision-support tools and social behavior framing management, policy, and design decisions, as well considerations associated with the efficiency, effectiveness and the fairness of such decisions.

Weekly Themes

- Climate Change Science
- Energy and Carbon in the Built Environment
- Sustainability Science
- Adaptation Science
- Federal, State and Local Planning and Policy
- Risk and Vulnerability
- Community Resilience
- Disaster Resilience
- Human Health and Climate Change
- Land Use and Ecosystem Services
- Water
- Engineering Resilience
- Economics of Adaptation
- Housing and Climate Migration
- Climate Justice

Required Textbooks

- There are no required textbooks for this course. All of the required and supplemental reading is available for free on Canvas.

Student Evaluation

Students will be evaluated and graded based on either of the following models:

- 10% Classroom Participation
- 30% Midterm Exam
- 60% Final Take-home Exam
- 5% NCA4 Seminar Presentation Extra Credit
- 5% Podcast Extra Credit¹

¹ Students may receive extra points equivalent to five percent (5%) of the total grade by listening to at least two (2) episodes of the podcast *America Adapts* and writing two (2) 500-word reports that connect an issue in the podcast to a relevant piece of academic research.

As part of the seminar reading of 4th National Climate Assessment (NCA4), students may present a short (approximately 10 minute) presentation on one of the NCA4 chapters for extra credit. Students may select that chapter that most closely aligns with their interests. NCA4 presentations must be submitted to Canvas (.pdf only) by 11:59 p.m. on the Monday before the assigned presentation date.

The Midterm and Final Exams are open-book examinations that are intended to be completed outside of the classroom on Canvas. Student evaluation will be carried out in accordance with all relevant university and Tulane School of Architecture's grading policies and protocols. All deliverables are due on the specified date. The method of submission is an emailed digital copy (.pdf only) to Canvas by 5:00 p.m. (C.T.) on the due date. Late deliverables will not be accepted, but for those circumstances, such as illness, that are documented and delivered in an acceptable format to myself and the applicable degree program office. Students are expected to maintain compliance with all university and school policies relating to academic honesty, attendance, classroom decorum and other such policies that may be applicable to their participation in the class as members of the university community.

Classroom participation is based on intellectual contributions made throughout the course that demonstrate an active internalization of the course literature and the topics covered in the lectures. The intent of the course is to learn substantive knowledge and to develop analytical and writing skills. This syllabus provides a set of supplemental readings and resources that will provide more than an adequate amount of information for students to independently study climate change related research and practice. It is critical that students stay up-to-date with the reading. Students are expected to complete the reading assigned for each class. In addition to the reading in the course textbooks, students should read the academic, technical and policy literature assigned for each class. In order to maximize the value of the course, it is critical that students designate time each week to reading and to abstracting the literature. *Reading assignments marked with an asterisk (*) are optional.* These optional readings are referenced in the lecture and may be a resource for further directed studies.

Course Schedule

1. Tuesday, August 23rd: Introduction to Climate Change Science I
2. Thursday, August 25th: Introduction to Climate Change Science II
3. Tuesday, August 30th: Introduction to Climate Change Science III
4. Thursday, September 1st: Energy, Carbon and GHG in the Built Environment
5. Tuesday, September 6th: Sustainability Science: Theory
6. Thursday, September 8th: Sustainability Science: Practice
7. Tuesday, September 13th: Adaptation Science: From Biology to Social Science
8. Thursday, September 15th: Resilience: From Ecology to Community
9. Tuesday, September 20th: Vulnerability: Sensitivity, Exposure, and Adaptive Capacity
10. Thursday, September 22nd: Maladaptation: Trade-offs and Conflicts
11. Tuesday, September 27th: Science to Policy: Disasters and Hazard Mitigation
12. Thursday, September 29th: Science to Policy: Federal Climate Action
13. Tuesday, October 4th: Science to Policy: State and Local Planning

14. Tuesday, October 11th: Midterm Exam
15. Thursday, October 13th: Risk and Disaster Resilience
16. Tuesday, October 18th: Community Resilience
17. Thursday, October 20th: Human Health and Climate Change
18. Tuesday, October 25th: Land Use and Ecosystem Services
19. Thursday, October 27th: Engineering Resilience: Built Environment
20. Tuesday, November 1st: Engineering Resilience: Systems
21. Thursday, November 3rd: Economics of Adaptation: Decision Support
22. Tuesday, November 8th: Climate Economics: Multi-Sector Perspectives
23. Thursday, November 10th: Water
24. Tuesday, November 15th: Housing, Real Estate and Climigration
25. Thursday, November 17th: Climate Justice: Distributional Equity and Procedural Justice
26. Tuesday, November 29th: NCA4 Seminar Presentations
27. Thursday, December 1st: NCA4 Seminar Presentations
28. Tuesday, December 6th: Final Review
29. Thursday, December 8th: Reading Day
30. Friday, December 1st: Release of Final Exam
31. Saturday, December 17th: Final Exam Due

Required Course Reading

1. *Introduction to Climate Change Science*
 - i. U.S. Global Change Research Program (USGCRP)(2017). Chapter 1: Our Globally Changing Climate. In *National Climate Assessment: Volume 1: Climate Science*. Retrieved from <https://science2017.globalchange.gov/>
2. *Energy, Carbon and GHG in the Built Environment*
 - i. Intergovernmental Panel on Climate Change (IPCC)(2022). *Chapter 9: Buildings*. In *Climate Change 2022: Mitigation of Climate Change*. Geneva, CH.: IPCC. [Pages 1-31].
3. *Sustainability Science*
 - i. Intergovernmental Panel on Climate Change (IPCC)(2022). *Chapter 9: Buildings*. In *Climate Change 2022: Mitigation of Climate Change*. Geneva, CH.: IPCC. [Pages 32-54].
 - ii. Purvis, B., Mao, Y., & Robinson, D. (2019). Three Pillars of Sustainability: in Search of Conceptual Origins. *Sustainability Science*, 14(3), 681-695.

4. Adaptation Science

- i. Adger, W.N., Arnell, N.W., & Thompkins, E. (2005). Successful Adaptation to Climate Change Across Scales. *Global Environmental Change*, 15, 77-86.
- ii. Berrang-Ford, L., Siders, A. R., Lesnikowski, A., Fischer, A. P., Callaghan, M. W., Haddaway, N. R., ... & Abu, T. Z. (2021). A Systematic Global Stocktake of Evidence on Human Adaptation to Climate Change. *Nature Climate Change*, 11(11), 989-1000.
- iii. Preston, B.L., Mustelin, J. & Maloney, M.C. (2013). Climate Adaptation Heuristics and the Science/Policy Divide. *Mitigation and Adaptation Strategies for Global Change*, 20(3), 467-497
- iv. Smit, B., Burton, I., Klein, R. J., & Wandel, J. (2000). An Anatomy of Adaptation to Climate Change and Variability. *Climatic Change*, 45(1), 223-251.

5. Resilience

- i. Holling, C. S. (1973). Resilience and Stability of Ecological Systems. *Annual Review of Ecology and Systematics*, 4, 1-23.
- ii. Keenan, J.M. (2018). *Climate Adaptation Finance and Investment in California*. London, UK.: Routledge. [Pages 4-13].
- iii. Meerow, S., Newell, J.P., & Stults, M. (2016). Defining Urban Resilience: A Review. *Landscape and Urban Planning*, 147, 38-49.

6. Vulnerability

- i. Thomas, K., Hardy, R. D., Lazrus, H., Mendez, M., Orlove, B., Rivera-Collazo, I., & Winthrop, R. (2019). Explaining Differential Vulnerability to Climate Change: A Social Science Review. *Wiley Interdisciplinary Reviews: Climate Change*, 10(2), e565.

7. Maladaptation

- i. Gillard, R. (2016). Questioning the Diffusion of Resilience Discourses in Pursuit of Transformational Change. *Global Environmental Politics*, 16(1), 13-20.
- ii. Juhola, S., Glaas, E., Linnér, B. O., & Neset, T. S. (2016). Redefining Maladaptation. *Environmental Science & Policy*, 55, 135-140.
- iii. Olsson, L., Jerneck, A., Thoren, H., Persson, J., & O'Byrne, D. (2015). Why Resilience is Unappealing to Social Science: Theoretical and Empirical Investigations of the Scientific Use of Resilience. *Science Advances*, 1(4), e1400217. doi: 10.1126/sciadv.1400217

8. Science to Policy: Disasters and Hazard Mitigation

- i. Brown, J.T. & Lindsay, B.R. (2018). *Congressional Primer on Responding to Major Disasters and Emergencies*. Washington, D.C.: Congressional Research Service.
- ii. Congressional Research Service (CRS)(2019). *A Brief Introduction to the National Flood Insurance Program*. Washington, D.C.: Congressional Research Service.
- iii. Horn, D.P. (2019). *Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance*. Washington, D.C.: Congressional Research Service.

9. Science to Policy: Federal Climate Action

- i. Council on Environmental Quality (2021). *Federal Climate Adaptation Plans*. Washington, D.C.: Executive Office of the President, The White House. Retrieved from <https://www.sustainability.gov/adaptation/> [Note: Please read one plan that is most closely aligned with your interests. For buildings, please read the General Services Administration. For infrastructure, please read the U.S. Army Corps of Engineers, Department of Energy or Department of Transportation.]
- ii. Keenan, J.M. (2017). From Climate Change to National Security: An Empirical Analysis of the Obama Administration’s Federal Resilience Mandates and Measures. *Natural Hazards Review*, 19(1), 0401722. doi: 10.1061/(ASCE)NH.1527-6996.0000273
- iii. The White House (2021). *The Long-Term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050*. Washington, D.C.: U.S. State Department.

10. Science to Policy: State and Local Adaptation Planning

- i. Keenan, J.M. (2018). Types and Forms of Resilience in Local Government Planning: Who Does What? *Environmental Science and Policy*, 88(1), 116-123. doi: 10.1016/j.envsci.2018.06.015
- ii. Lyles, W., Berke, P., & Overstreet, K. H. (2018). Where to Begin Municipal Climate Adaptation Planning? Evaluating Two Local Choices. *Journal of Environmental Planning and Management*, 61(11), 1994-2014.
- iii. Woodruff, S. C., Meerow, S., Stults, M., & Wilkins, C. (2018). Adaptation to resilience planning: Alternative pathways to prepare for climate change. *Journal of Planning Education and Research*, 42(1), 64-75.

11. Risk and Disaster Resilience

- i. Burton, C. G. (2015). A Validation of Metrics for Community Resilience to Natural Hazards and Disasters Using the Recovery from Hurricane Katrina as a Case Study. *Annals of the Association of American Geographers*, 105(1), 67-86.
- ii. Cutter, S.L. (2016). The Landscape of Disaster Resilience Indicators in the USA. *Natural Hazards*, 80, 741-758. doi: 10.1007/s11069-015-1993-2
- iii. United Nation's Office of Disaster Risk Reduction (UNDRR)(2017). *Disaster Resilience Scorecard for Cities*. Geneva, CH.: United Nations.

12. Community Resilience

- i. Aldrich, D.P & Kyota, E. (2016). Creating Community Resilience Through Elder-Led Physical and Social Infrastructure. *Disaster Medicine and Public Health Preparedness*. doi: 10.1017/dmp.2016.206
- ii. Berkes, F., & Ross, H. (2016). Panarchy and Community Resilience: Sustainability Science and Policy Implications. *Environmental Science & Policy*, 61, 185-193.
- iii. Keenan, J.M. & Maxwell, K. (2021). Rethinking the Design of Resilience and Adaptation Indicators in Coastal Communities. *Journal of Environmental Planning and Management*. doi:10.1080/09640568.2021.1971635
- iv. *National Institutes of Standards and Technology (NIST)(2015). *Community Resilience Planning Guide for Buildings and Infrastructure Systems*, Vol. 1. Washington, D.C.: U.S. Department of Commerce. Vol. 1 doi: 10.6028/NIST.SP.1190v1 [Note: Please review (e.g., skim)]

13. Human Health and Climate Change

- i. Bay Area Regional Health Inequities Initiative (BARHII)(2019). *Climate Change: What's Public Health Got to Do With It?*. Oakland, CA.: BARHII.
- ii. Bay Area Regional Health Inequities Initiative (BARHII)(2019). *Health and Equity Co-Benefits of Addressing Climate Change*. Oakland, CA.: BARHII.
- iii. Ebi, K.L., Balbus, J.M., Luber, G., Bole, A., Crimmins, A., Glass, G., Saha, S., Shimamoto, M.M., Trtanj, J., & White-Newsome, J.L. (2018). Human Health. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., Avery, C.W., Easterling, D.R., Kunkel, K.E., Lewis, K.L.M., Maycock, T.K., & Stewart, B.C. (eds.)]. Washington, D.C.: U.S. Global Change Research Program. doi:10.7930/NCA4.2018.CH14

14. Land Use and Ecosystem Services

- i. Lipton, D., Rubenstein, M.A., Weiskopf, S.R., Carter, S., Peterson, J., Crozier, L., Fogarty, M., Gaichas, S., Hyde, K.J.W., Morelli, T.L., Morissette, J., Moustahfid, H., Muñoz, R., Poudel, R., Staudinger, M.D., Stock, C., Thompson, L., Waples, R., & Weltzin, J.F. (2018). Ecosystems, Ecosystem Services, and Biodiversity. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., Avery, C.W., Easterling, D.R., Kunkel, K.E., Lewis, K.L.M., Maycock, T.K., & Stewart, B.C. (eds.)]. Washington, D.C.: U.S. Global Change Research Program. doi:10.7930/NCA4.2018.CH7

15. Engineering Resilience: Built Environment

- i. Enterprise Community Partners (2015). *Strategies for Multifamily Building Resilience*. New York, NY.: Enterprise Community Partners, Inc.
- ii. Maxwell, K., Julius, S., Grambsch, A., Kosmal, A., Larson, L., & Sonti, N. (2018). Built Environment, Urban Systems, and Cities. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., Avery, C.W., Easterling, D.R., Kunkel, K.E., Lewis, K.L.M., Maycock, T.K., & Stewart, B.C. (eds.)]. Washington, D.C.: U.S. Global Change Research Program. doi:10.7930/NCA4.2018.CH10

16. Engineering Resilience: Systems

- i. Ayyub, B.M. (2014). Systems Resilience for Multi-hazard Environments: Definitions, Metrics, and Valuation for Decision Making. *Risk Analysis*, 34, 2, 340-355. doi: 10.1111/risa.12093
- ii. Hosseini, S., Barker, K., & Ramirez-Marquez, J. E. (2016). A Review of Definitions and Measures of System Resilience. *Reliability Engineering & System Safety*, 145, 47-61.

17. Economics of Adaptation: Decision Support

- i. Keenan, J.M. (2018). *Climate Adaptation Finance and Investment in California*. London, UK.: Routledge. [Chapter 2].
- ii. Keenan, J.M. (2015). From Sustainability to Adaptation: A Case Study of Goldman Sach's Corporate Real Estate Strategy. *Building Research & Information*, 43(6), 1-15.
- iii. Siders, A. R., & Pierce, A. L. (2021). Deciding how to make climate change adaptation decisions. *Current Opinion in Environmental Sustainability*, 52, 1-8.

18. Economics of Adaptation: Multi-Sector Perspectives

- i. Keenan, J. M. (2019). A Climate Intelligence Arms Race in Financial Markets. *Science*, 365(6459), 1240-1243. doi:10.1126/science.aay8442
- ii. Martinez-Diaz, L. & Keenan, J.M. (Eds.).(2020). *Managing Climate Risk in the U.S. Financial System*. Washington, D.C.: U.S. Commodity Futures Trading Commission. [Chapter 2]

19. Water

- i. Lall, U., T. Johnson, P. Colohan, A. Aghakouchak, C. Brown, G. McCabe, R. Pulwarty, and A. Sankarasubramanian (2018). Water. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. Washington, D.C.: U.S. Global Change Research Program. doi: 10.7930/NCA4.2018.CH3.
- ii. Joseph, N., Ryu, D., Malano, H. M., George, B., & Sudheer, K. P. (2020). A Review of the Assessment of Sustainable Water Use at Continental-to-Global Scale. *Sustainable Water Resources Management*, 6(2), 1-20. doi:10.1007/s40899-020-00379-7

20. Housing, Real Estate, and Climigration

- i. Keenan, J.M. & Bradt, J.T. (2020). Underwaterwriting: From Theory to Empiricism in Regional U.S. Coastal Mortgage Markets. *Climatic Change*. doi: 10.1007/s10584-020-02734-1
- ii. Keenan, J. M., Hill, T., & Gumber, A. (2018). Climate Gentrification: from Theory to Empiricism in Miami-Dade County, Florida. *Environmental Research Letters*, 13(5), 054001. doi: 10.1088/1748-9326/aabb32/meta
- iii. Matthews, T., & Potts, R. (2018). Planning for Climigration: A Framework for Effective Action. *Climatic Change*, 148(4), 607-621.

21. Climate Justice: Distributional Equity and Procedural Justice

- i. Fitzgerald, J. (2022). Transitioning From Urban Climate Action to Climate Equity. *Journal of the American Planning Association*, 1-16. doi: 10.1080/01944363.2021.2013301
- ii. Keenan, J.M. (2018). *Climate Adaptation Finance and Investment in California*. London, UK.: Routledge. [Chapter 5].
- iii. Ripple, J. (2016). The Type V City: Encoding Material Inequity. *Journal of Architectural Education*, 70(10), 13-16. doi: 10.1080/10464883.2016.1122464

Supplemental Course Reading

1. Introduction to Climate Change Science

- i. *National Academy of Science (NAS)(2016). *Attribution of Extreme Weather Events in the Context of Climate Change*. Washington, DC.: The National Academies Press. doi: 10.17226/21852.
- ii. *National Oceanographic and Atmospheric Administration (NOAA)(2017). The Essential Principles of Climate Literacy. Retrieved from <https://www.climate.gov/teaching/essential-principles-climate-literacy/essential-principles-climate-literacy>

2. Energy, Carbon and GHG in the Built Environment

- i. *Intergovernmental Panel on Climate Change (IPCC)(2022). *Chapter 9: Buildings*. In *Climate Change 2022: Mitigation of Climate Change*. Geneva, CH.: IPCC.
- ii. *Intergovernmental Panel on Climate Change (IPCC)(2022). *Chapter 8: Urban Systems*. In *Climate Change 2022: Mitigation of Climate Change*. Geneva, CH.: IPCC.

3. Sustainability Science

- i. *Caradonna, J. L. (2014). *Sustainability: A History*. New York, NY.: Oxford University Press. [Chapter 3]
- ii. *Clark, W., & Harley, A. (2019). Sustainability Science: Towards a Synthesis. *Annual Review of Environment and Resources*, 45(1), 331-386. doi: 10.1146/annurev-environ-012420-043621
- iii. *Intergovernmental Panel on Climate Change (IPCC)(2022). *Chapter 9: Buildings*. In *Climate Change 2022: Mitigation of Climate Change*. Geneva, CH.: IPCC. [Pages 51-74].
- iv. *U.S. Energy Information Administration, U.S. Department of Energy (2020). *Commercial Building Energy Consumption Survey (CBECS)*. Retrieved from <https://www.eia.gov/consumption/commercial/>
- v. *U.S. Energy Information Administration, U.S. Department of Energy (2020). *Residential Building Energy Consumption Survey (RECS)*. Retrieved from <https://www.eia.gov/consumption/residential/index.php>

4. Adaptation Science

- i. *Dow, K., Berkhout, F., Preston, B. L., Klein, R. J., Midgley, G., & Shaw, M. R. (2013). Limits to Adaptation. *Nature Climate Change*, 3(4), 305-307.
- ii. *Intergovernmental Panel on Climate Change (IPCC)(2022). *Chapter 1: Points of Departure and Key Concepts*. In *Climate Change 2022: Impacts, Adaptation and Vulnerability*. Geneva, CH.: IPCC.

- iii. *Intergovernmental Panel on Climate Change (IPCC)(2022). *Chapter 6: Cities, Settlements and Key Infrastructure*. In *Climate Change 2022: Impacts, Adaptation and Vulnerability*. Geneva, CH.: IPCC.
- iv. *Moser, S.C. & Ekstrom, J.A. (2010). A Framework to Diagnose Barriers to Climate Change Adaptation. *Proceedings of the National Academy of Sciences*, 107(51), 22026-22031.
- v. *Parmesan, C. (2006). Ecological and Evolutionary Responses to Recent Climate Change. *Annual Review of Ecology, Evolution, and Systematics*, 37, 637-669.
- vi. *Rickards, L. (2013). Transformation is Adaptation. *Nature Climate Change*, 3(8), 690-690.\

5. Resilience

- i. *Alexander, D.E. (2013). Resilience and Disaster Risk Reduction: An Etymological Journey. *Natural Hazards and Earth Systems Sciences*, 13, 2707-2716.
- ii. *Brand, F. S., & Jax, K. (2007). Focusing on the Meaning (s) of Resilience: Resilience as a Descriptive Concept and a Boundary Object. *Ecology and Society*, 12(1), 23.
- iii. *Carpenter, S., Walker, B., Anderies, J.M. & Abel, N. (2001). From Metaphor to Measurement: Resilience of What to What?. *Ecosystems*, 4(8), 765-781.
- iv. *Davidson, J., Jacobson, C., Lyth, A., Dedekorkut-Howes, A., Baldwin, C., Ellison, J., Holbrook, N., Howes, M., Serrao-Neumann, S., Singh-Peterson, L., & Smith, T. (2016). Interrogating resilience: toward a typology to improve its operationalization. *Ecology and Society*, 21(2), Art 27.
- v. *Gunderson, L.H. (2000). Ecological Resilience--in Theory and Application. *Annual Review of Ecology and Systematics*, 31, 425-439.
- vi. *Lorenz, D.F. (2013). The Diversity of Resilience: Contributions from a Social Science Perspective. *Natural Hazards*, 67(1), 7-24.
- vii. *Moser, S., Meerow, S., Arnott, J., & Jack-Scott, E. (2019). The Turbulent World of Resilience: Interpretations and Themes for Transdisciplinary Dialog. *Climatic Change*. doi: 10.1007/s10584-018-2358-0

6. Vulnerability

- i. *Grothmann, T., & Patt, A. (2005). Adaptive Capacity and Human Cognition: the Process of Individual Adaptation to Climate Change. *Global Environmental Change*, 15(3), 199-213.
- ii. *Keenan, J.M. (2015). Adaptive Capacity of Commercial Real Estate Firms in New York City to Urban Flooding. *Journal of Water and Climate Change*, 6(3), 486-500.

- iii. *Sharma, J., & Ravindranath, N. H. (2019). Applying IPCC 2014 Framework for Hazard-specific Vulnerability Assessment Under Climate Change. *Environmental Research Communications*, 1(5), 051004.
- iv. *Smit, B., & Wandel, J. (2006). Adaptation, Adaptive Capacity and Vulnerability. *Global Environmental Change*, 16(3), 282-292.
- v. *Van den Berg, H. & Keenan, J.M. (2019). Dynamic Vulnerability in the Pursuit of Just Adaptation Processes: A Boston Case Study. *Environmental Science and Policy*, 94(1), 90-100. doi: 10.1016/j.envsci.2018.12.015

7. Maladaptation

- i. *Brown, K. (2011). Sustainable Adaptation: An Oxymoron?. *Climate and Development*, 3(1), 21-31.
- ii. *Fisichelli, N. A., Schuurman, G. W., & Hoffman, C. H. (2016). Is 'Resilience' Maladaptive? Towards an Accurate Lexicon for Climate Change Adaptation. *Environmental Management*, 57(4), 753-758.
- iii. *[IPCC] Parry, A. & Martin, .L (Eds).(2007). Climate Change 2007: TS 5.2 Interrelationships between Adaptation and Mitigation. In *Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Vol. 4*. Cambridge, U.K.: Cambridge University Press.
- iv. *Klein, R.J., Nicholls, R.J. & Thomalla, F. (2003). Resilience to Natural Hazards: How Useful is this Concept?. *Global Environmental Change Part B: Environmental Hazards*, 5(1), 35-45.
- v. *Magnan, A. K., Schipper, E. L. F., Burkett, M., Bharwani, S., Burton, I., Eriksen, S., & Ziervogel, G. (2016). Addressing the Risk of Maladaptation to Climate Change. *Wiley Interdisciplinary Reviews: Climate Change*, 7(5), 646-665.
- vi. *Nelson, D.R. (2011). Adaptation and Resilience: Responding to a Changing Climate. *Wiley Interdisciplinary Reviews: Climate Change*, 2(1), 113-120.

8. Science to Policy: Disasters and Hazard Mitigation

- i. *Congressional Research Service (CRS)(2019). *Introduction to the National Flood Insurance Program (NFIP)*. Washington, D.C.: Congressional Research Service.
- ii. *Congressional Research Service (CRS)(2019). *FEMA and SBA Disaster Assistance for Individuals and Households: Application Processes, Determinations, and Appeals*. Washington, D.C.: Congressional Research Service.
- iii. *Congressional Research Service (CRS)(2019). *The Disaster Recovery Reform Act: Homeland Security Issues in the 116th Congress*. Washington, D.C.: Congressional Research Service.

- iv. *Congressional Research Service (CRS)(2015). *FEMA's Public Assistance Grant Program: Background and Considerations for Congress*. Washington, D.C.: Congressional Research Service.
- v. *Federal Emergency Management Agency (FEMA)(2020). *Proposed Policy: Building Resilient Infrastructure and Communities (BRIC)*. Washington, D.C.: U.S. Department of Homeland Security
- vi. *Federal Emergency Management Agency (FEMA)(2019). *National Response Framework*. Washington, D.C.: U.S. Department of Homeland Security.
- vii. *Federal Emergency Management Agency (FEMA)(2016). *National Disaster Recovery Framework*. Washington, D.C.: U.S. Department of Homeland Security.

9. *Science to Policy: Federal Climate Action*

- i. *America Adapts Podcast (2021, November 8th). *Federal Climate Adaptation Plans: Part 1*. Retrieved from <https://www.americaadapts.org/episodes/federal-climate-adaptation-plans-part-1-with-dr-jesse-keenan>
- ii. *America Adapts Podcast (2021, November 28th). *Federal Climate Adaptation Plans: Part 2*. Retrieved from <https://www.americaadapts.org/episodes/federal-climate-adaptation-plans-part-2-where-is-the-us-national-adaptation-plan>
- iii. *Council on Climate Preparedness and Resilience (CCPR)(2016). *Opportunities to Enhance the Nation's Resilience to Climate Change*. Washington, DC.: Executive Office of the President, The White House.
- iv. *Council on Environmental Quality (2021). *Federal Climate Adaptation Plans*. Washington, D.C.: Executive Office of the President, The White House. Retrieved from <https://www.sustainability.gov/adaptation/>
- v. *Larkin, S., Fox-Lent, C., Eisenberg, D. A., Trump, B. D., Wallace, S., Chadderton, C., & Linkov, I. (2015). Benchmarking Agency and Organizational Practices in Resilience Decision Making. *Environment Systems and Decisions*, 35(2), 185-195.
- vi. *Leggett, J. A. (2015, February 23rd). *Climate Change Adaptation by Federal Agencies: An Analysis of Plans and Issues for Congress*. Washington, D.C.: Congressional Research Service.
- vii. *Saha, D., Carlock, G., Shrestha, R., Feldman, J. & Leslie-Bole, H. (2021). *Building Blocks for a Low-Carbon Economy: Catalytic Policy and Infrastructure for Decarbonizing the United States by 2050*. Working Paper. Washington, D.C.: World Resource Institute.
- viii. *U.S. Government Accountability Office (GAO)(2016). *Climate Change: Selected Governments Have Approached Adaptation Through Laws and Long-term Plans*. Report GAO-16-454. Washington, D.C.: Government Accountability Office.
- ix. *U.S. Government Accountability Office (GAO)(2019). *Disaster Resilience Framework: Principles for Analyzing Federal Efforts to*

- Facilitate and Promote Resilience to Natural Disasters*. GAO-20-100SP. Washington, D.C.: Government Accountability Office.
- x. *The White House (2013). *The President's Climate Action Plan*. Washington, D.C.: Executive Office of the President, The White House.

10. Science to Policy: State and Local Adaptation Planning

- i. *Adler, D.P. & Gosliner, E. (2019). *State Hazard Mitigation Plans & Climate Change: 2019 Update*. New York, NY.: Columbia University Law School, Sabin Center for Climate Change Law.
- ii. *Commonwealth of Massachusetts (2018). *Massachusetts State Hazard Mitigation and Climate Adaptation Plan*. Boston, MA.: Executive Office of Energy and Environmental Affairs and Massachusetts Emergency Management Agency.
- iii. *Gilmore, E. A., & St. Clair, T. (2018). Budgeting for climate change: Obstacles and opportunities at the US state level. *Climate Policy*, 18(6), 729-741. doi: 10.1080/14693062.2017.1366891
- iv. *Goldsmith-Pinkham, P. S., Gustafson, M., Lewis, R., & Schwert, M. (2020, May 8th). *Sea Level Rise and Municipal Bond Yields*. Working Paper. doi:10.2139/ssrn.3478364
- v. *Keenan, J.M. (2018). *Climate Adaptation Finance and Investment in California*. London, UK.: Routledge. [Chapter 3].
- vi. *Louisiana Governor's Office of Homeland Security (2019). *State Hazard Mitigation Guide*. Baton Rouge, LA.: State of Louisiana.
- vii. *Shi, L., & Varuzzo, A. M. (2020). Surging seas, rising fiscal stress: Exploring municipal fiscal vulnerability to climate change. *Cities*, 100, 102658. doi:10.1016/j.cities.2020.102658

11. Risk and Disaster Resilience

- i. *National Institute of Building Science (NIBS)(2017). *Natural Hazard Mitigation Saves: 2017 Interim Report*. Washington, DC.: Multihazard Mitigation Council, NIBS.
- ii. *Samuelson, W. & Zeckhauser, R. (1988). Status Quo Bias in Decision Making. *Journal of Risk and Uncertainty*, 1(1), 7-59.
- iii. *Sunstein, C.R. (2006). The Availability Heuristic, Intuitive Cost-benefit Analysis, and Climate Change. *Climatic Change*, 77(1), 195-210
- iv. *Tidball, K. (2012). Urgent Biophilia: Human-Nature Interactions and Biological Attractions in Disaster Resilience. *Ecology and Society*, 17(2). doi: 10.5751/ES-04596-170205
- v. *White House (2013). *Presidential Policy Directive 21: Critical Infrastructure Security and Resilience*. Washington, D.C.: Executive Office of the President, White House.

12. Community Resilience

- i. *Davis, D. E. (2012). *Urban Resilience in Situations of Chronic Violence*. Report. Cambridge, MA.: MIT Center for International Studies.
- ii. *Federal Emergency Management Agency (FEMA)(2016). *Draft Interagency Concept for Community Resilience Indicators and National-level Measures. Mitigation Framework Leadership Group Draft Concept Paper*. Washington, DC.: U.S. Department of Homeland Security.
- iii. *Hill, K. (2016). Climate Change: Implications for the Assumptions, Goals and Methods of Urban Environmental Planning. *Urban Planning*, 1(4), 103-113.
- iv. *Keenan, J. M., King, D. A., & Willis, D. (2016). Understanding Conceptual Climate Change Meanings and Preferences of Multi-Actor Professional Leadership in New York. *Journal of Environmental Policy & Planning*, 18(3), 261-285.
- v. *Koliou, M., van de Lindt, J. W., McAllister, T. P., Ellingwood, B. R., Dillard, M., & Cutler, H. (2020). State of the research in community resilience: Progress and challenges. *Sustainable and resilient infrastructure*, 5(3), 131-151.
- vi. *Matarrita-Cascante, D., Trejos, B., Qin, H., Joo, D., & Debner, S. (2017). Conceptualizing community resilience: Revisiting conceptual distinctions. *Community Development*, 48(1), 105-123.
- vii. *National Institutes of Standards and Technology (NIST)(2015). *Community Resilience Planning Guide for Buildings and Infrastructure Systems*, Vol. 1. Washington, D.C.: U.S. Department of Commerce. Vol. 1 doi: 10.6028/NIST.SP.1190v1
- viii. *Sharifi, A. (2016). A Critical Review of Selected Tools for Assessing Community Resilience. *Ecological Indicators*, 69, 629-647. doi: j.ecolind.2016.05.023

13. Human Health and Climate Change

- i. *Day, E., Fankhauser, S., Kingsmill, N., Costa, H., & Mavrogianni, A. (2019). Upholding labour productivity under climate change: an assessment of adaptation options. *Climate Policy*, 19(3), 367-385. doi:10.1080/14693062.2018.1517640

14. Land Use and Ecosystem Services

- i. *Gowda, P., Steiner, J. L., Olson, C., Boggess, M., Farrigan, T., & Grusak, M. A. (2018). Agriculture and Rural Communities. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., Avery, C.W., Easterling, D.R., Kunkel, K.E., Lewis, K.L.M., Maycock, T.K., & Stewart, B.C. (eds.)].

- Washington, D.C.: U.S. Global Change Research Program.
doi:10.7930/NCA4.2018.CH10
- ii. *Shukla, J. M., Skea, J., Buendia, E. C., Masson-Delmotte, V., Pörtner, H. O., Roberts, D. C., .& van Diemen, R. (2019). *Summary for Policymakers. Climate Change and Land: An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems*. Geneva, CH.: Intergovernmental Panel on Climate Change (IPCC).
 - iii. *Shuster, E. & Doerr, P. (2015). *A Guide for Incorporating Ecosystem Service Valuation into Coastal Restoration Project*. Washington, D.C.: The Nature Conservancy.

15. Engineering Resilience: Built Environment

- i. *Keenan, J. M. (2014). Material and Social Construction: A Framework for the Adaptation of Buildings. *Enquiry: Journal of Architectural Research*, 11(1), 18–32. doi:10.17831/enq:arcc.v11i1.271
- ii. *National Institutes of Standards and Technology (NIST)(2015). *Community Resilience Planning Guide for Buildings and Infrastructure Systems, Vol. 2*. Washington, D.C.: U.S. Department of Commerce. Vol. 2 doi: 10.6028/NIST.SP.1190v2
- iii. *U.S. General Services Administration (GSA)(2016). *Facilities Standards for the Public Building Service*. P-100 [Section 1.10.3 Climate Change Risk Management]. Washington, DC. Retrieved from https://www.gsa.gov/portal/mediaId/127494/fileName/P100_2016.action
- iv. *U.S. Government Accountability Office (GAO)(2016). *Climate Change: Improved Federal Coordination Could Facilitate Use of Forward-Looking Climate Information in Design Standards, Building Codes and Certifications*. GAO-17-3. Washington, D.C.: GAO.

16. Engineering Resilience: Systems

- i. *Cook, L. M., Anderson, C. J., & Samaras, C. (2017). Framework for Incorporating Downscaled Climate Output into Existing Engineering Methods: Application to Precipitation Frequency Curves. *Journal of Infrastructure Systems*, 23(4), 04017027. doi: 10.1061/(ASCE)IS.1943-555X.0000382
- ii. *Cybersecurity and Infrastructure Security Agency, Infrastructure Security Division, U.S. Department of Homeland Security (CISA)(2021). *Methodology for Assessing Regional Infrastructure Resilience: Lessons Learned from the Regional Resiliency Assessment Program*. Washington, D.C.: U.S. Department of Homeland Security.
- iii. *Jacobs, J.M., M. Culp, L. Cattaneo, P. Chinowsky, A. Choate, S. DesRoches, S. Douglass, and R. Miller (2018). Transportation. In *Impacts, Risks, and Adaptation in the United States: Fourth National*

- Climate Assessment, Volume II* [Reidmiller, D.R., Avery, C.W., Easterling, D.R., Kunkel, K.E., Lewis, K.L.M., Maycock, T.K., & Stewart, B.C. (eds.)]. Washington, D.C.: U.S. Global Change Research Program. doi:10.7930/NCA4.2018.CH12
- iv. *Martello, M. V., Whittle, A. J., Keenan, J. M., & Salvucci, F. P. (2021). Evaluation of Climate Change Resilience for Boston's Rail Rapid Transit Network. *Transportation Research Part D: Transport and Environment*, 97, 102908.
 - v. *Wilbanks, T. J., Fernandez, S.J. (2014). Climate Change and Infrastructure, Urban Systems, and Vulnerabilities. Washington, D.C.: Island Press. [Chapters 2-3]
 - vi. *Woods, D. D., and Wreathall, J. (2008). Stress-strain Plots as a Basis for Assessing System Resilience. In E. Hollnagel, C.P. Nemeth and S. Dekker (Eds.), *Resilience Engineering: Remaining Sensitive to the Possibility of Failure* (pp. 145-161). Aldershot, U.K.: Ashgate.

17. Economics of Adaptation: Decision Support

- i. *Fankhauser, S., Smith, J. B., & Tol, R. S. (1999). Weathering Climate Change: Some Simple Rules to Guide Adaptation Decisions. *Ecological Economics*, 30(1), 67-78.
- ii. *Hallegatte, S. (2009). Strategies to Adapt to an Uncertain Climate Change. *Global Environmental Change*, 19(2), 240-247.
- iii. *Keenan, J.M. (2016). Private Mainstreaming: Using Contract and Strategic Processes to Promote Organizational and Institutional Adaptation. *Projections: MIT Journal of Planning*, 12, 113-133.
- iv. *Linnenluecke, M. K. (2017). Resilience in business and management research: A review of influential publications and a research agenda. *International Journal of Management Reviews*, 19(1), 4-30.
- v. *RAND Corporation (2013). *Making Good Decisions without Making Predictions: Robust Decision Making for Planning Under Deep Uncertainty*. Santa Monica, CA.: RAND Corporation.
- vi. *Stern, N. H. (2006). *Stern Review: The Economics of Climate Change*. London, U.K.: H.M. Treasury. [pp. 400-430]
- vii. *Watkiss, P., Hunt, A., Blyth, W., & Dyszynski, J. (2015). The Use of New Economic Decision Support Tools for Adaptation Assessment: A Review of Methods and Applications, Towards Guidance on Applicability. *Climatic Change*, 132(3), 401-416.

18. Climate Economics: Multi-Sector Perspectives

- i. *Blackrock Investment Institute (BII)(2019). *Getting Physical: Scenario Analysis for Assessing Climate Risks*. New York, NY.: Blackrock.
- ii. *Bolton, P., Despres, M., da Silva, L. A. P., Samama, F., & Svartzman, R. (2020). *The Green Swan: Central Banking and Financial Stability in*

- the Age of Climate Change*. Basel, CH.: Bank of International Settlements/Banque du France.
- iii. *Council of Economic Advisors (CEA)(2022) *Climate-Related Macroeconomic Risks and Opportunities*. Washington, D.C.: The White House.
 - iv. *Dietz, S., Bowen, A., Dixon, C., & Gradwell, P. (2016). ‘Climate value at risk’ of global financial assets. *Nature Climate Change*, 6(7), 676-679. doi:10.1038/nclimate2972
 - v. *Hsiang, S., Kopp, R., Jina, A., Rising, J., Delgado, M., Mohan, S., Rasmussen, D.J., Muir-Wood, R., Wilson, P., Oppenheimer, M., & Larsen, K. (2017). Estimating economic damage from climate change in the United States. *Science*, 356(6345), 1362-1369. doi: 10.1126/science.aal4369
 - vi. *Keenan, J.M., Trump, B.D., Hynes, W. & Linkov, I. (2021). Exploring the Convergence of Resilience Processes and Sustainable Outcomes in Post-COVID, Post-Glasgow Economies. *Sustainability*, 13(1), 13415. doi:10.3390/su132313415
 - vii. *McKinsey Global Institute (MGI)(2020). *Climate Risk and Response: Physical Hazards and Socioeconomic Response*. New York, NY.: McKinsey & Company.
 - viii. *Network from Greening the Financial System (NGFS)(2019). *A Call for Action: Climate Change as a Source of Financial Risk. First Comprehensive Report*. Paris, FR.: NGFS Secretariat/Banque de France.

19. Water

- i. *Fleming, E., J. Payne, W. Sweet, M. Craghan, J. Haines, J.F. Hart, H. Stiller, and A. Sutton-Grier (2018). Coastal Effects. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. Washington, D.C.: U.S. Global Change Research Program. doi: 10.7930/NCA4.2018.CH8.
- ii. *Groves, D.G., Knopman, D., Berg, N., Bond, C.A., Symer, J., & Lempert, R.J. (2018). *Adapting Land Use and Water Management Plans to a Changing Climate in Miami-Dade and Broward Counties, Florida*. Santa Monica, CA.: RAND Corporation.
- iii. *Sea Level Rise Task Force, Miami-Dade County (2016). *Report on Flooding and Salt Water Intrusion*. Final Report for Resolution R-48-15 in Support of Sea Level Rise Task Force Final Recommendations.
- iv. *Southeast Florida Regional Climate Change Compact (2019). *Unified Sea Level Rise Projection: Southeast Florida*. Retrieved from <https://southeastfloridaclimatecompact.org/resources/unified-sea-level-rise-projections/>
- v. *Siders, A.R. & Keenan, J.M. (2020). Variables Shaping Coastal Adaptation Decisions to Armor, Nourish, and Retreat in North Carolina.

- Ocean & Coastal Management*. 183(1), 105023. doi: 10.1016/j.ocecoaman.2019.105023
- vi. *World Bank (2016). *High and Dry: Climate Change, Water, and the Economy*. Washington, D.C.: World Bank Group.

20. Housing, Real Estate, and Climigration

- i. *Bernstein, A., Gustafson, M. T., & Lewis, R. (2019). Disaster on the Horizon: The Price Effect of Sea Level Rise. *Journal of Financial Economics*, 134(2), 253-272. doi:10.1016/j.jfineco.2019.03.013
- ii. *Duanmu, J., Li, Y., Lin, M., & Tahsin, S. (2022). Natural disaster risk and residential mortgage lending standards. *Journal of Real Estate Research*, 44(1), 106-130.
- iii. *Hauer, M. E., Evans, J. M., & Mishra, D. R. (2016). Millions Projected to be at Risk from Sea-level Rise in the Continental United States. *Nature Climate Change*, 6(7), 691-695.
- iv. *Ouazad, A., & Kahn, M. E. (2019). *Mortgage Finance in the Face of Rising Climate Risk*. NBER Working Paper No. 26322. Cambridge, MA.: National Bureau of Economic Research. Retrieved from <https://www.nber.org/papers/w26322>
- v. *Siders, A. R., Hino, M., & Mach, K. J. (2019). The Case for Strategic and Managed Climate Retreat. *Science*, 365(6455), 761-763.

21. Climate Justice: Distributional Equity and Procedural Justice

- i. *Bulkeley, H., Edwards, G. A., & Fuller, S. (2014). Contesting Climate Justice in the City: Examining Politics and Practice in Urban Climate Change Experiments. *Global Environmental Change*, 25, 31-40.
- ii. *Hallegatte, S., & Rozenberg, J. (2017). Climate Change Through a Poverty Lens. *Nature Climate Change*, 7(4), 250-256. doi: 10.1038/nclimate3253
- iii. *Keenan, J.M. & Galloway, I. (Eds.)(2019). *Strategies to Address Climate Change Risk in Low- and Moderate-Income Communities*. Community Development Innovation Review. San Francisco, CA.: Federal Reserve Bank of San Francisco. doi:10.24148/cdir2019-01
- iv. *Paavola, J. (2008). Science and Social Justice in the Governance of Adaptation to Climate Change. *Environmental Politics*, 17(4), 644-659.
- v. *Siders, A. R. (2019). Social Justice Implications of U.S. Managed Retreat Buyout Programs. *Climatic Change*, 152(2), 239-257.
- vi. *Van den Berg, H. & Keenan, J.M. (2019). Dynamic Vulnerability in the Pursuit of Just Adaptation Processes: A Boston Case Study. *Environmental Science and Policy*, 94(1), 90-100. doi: 10.1016/j.envsci.2018.12.015

Supplemental Resources

- America Adapts Podcast <http://www.americaadapts.org/>
- Intergovernmental Panel on Climate Change (IPCC) <https://www.ipcc.ch/>
- NASA Global Climate Change <http://climate.nasa.gov/>
- U.S. Climate Resilience Toolkit <https://toolkit.climate.gov/>
- U.S. Global Change Research Program <http://www.globalchange.gov/>

Appointments

Office Hours are on Zoom on Fridays by appointment: jkeenan@tulane.edu. Upon scheduling an appointment, please ensure to make note of your time zone.

Rules, Regulations and Resources (RRR)

General Expectations

Students must comply with all university and Tulane School of Architecture (“TSA”) rules and regulations, including those listed herein. Students are expected to work regularly and productively in fulfillment of the assignments. In order to receive effective feedback, students are expected to provide accessible digital or physical copies of ongoing design explorations demonstrating forward progress prior to the beginning of every session. All work is to be the product of the individual, unless teamwork is required. Students are also expected to integrate knowledge and skills acquired in previous courses. During presentations, all individuals are expected to carefully listen and participate absorb critiques directed toward other projects and apply what is relevant to their own work.

Communication

The Tulane e-mail system is an essential means communication. Students are responsible for maintaining an active Tulane e-mail account checked daily.

COVID-19 Policy

Faculty and students must comply with University policies on COVID-19 testing and isolation, which are located here <https://tulane.edu/covid-19/health-strategies>. Faculty and students must wear face coverings in all common areas, including classrooms, and follow social distancing rules. Failure to comply is a violation of the Code of Student Conduct and students will be subject to University discipline, which can include suspension or permanent dismissal.

Attendance Policy

Students are responsible for attending class. When attending remotely, video feed must be on. All absences must be reported to the course instructor prior to the beginning of the class; the only excused absences are those for reasons of health, significant outside activity or crisis. Unexcused absences could reduce the course grade, as will late arrival or early departure from class. Three

unexcused absences will reduce the final grade by one full letter grade. Five unexcused absences will lead to WF grade. A meeting with the TSA Director of Student Affairs will be required after two (n=2) unexcused absences. For further details, refer to the academic policies on the TSA website at: <https://architecture.tulane.edu/student-life/materials-policies>

Grading Distribution and Evaluation

Improvement and growth are the keys. The instructor will conduct his/her expert assessment on student performance and will assign grades consistent with the following:

- **A (excellent)** exceptional performance; exceeding the requirements of the course, showing strong academic initiative and independent resourcefulness.
- **B (good)** performance above the norm; accurate and complete; beyond the minimum requirements of the course; work demonstrates marked progress and initiative.
- **C (average)** satisfactory work that adequately meets minimum requirements and demonstrates satisfactory comprehension, communication skills, and effort; demonstrates little initiative to investigate the problem without substantial prodding of the instructor and/or work shows little improvement.
- **D (inferior)** unsatisfactorily meets minimum requirements; demonstrates minimum comprehension, communication skills, and effort at an inferior level; initiative lacking and/or improvement not noticeable.
- **F (failing)** does not meet minimum requirements; fails to adequately demonstrate comprehension, communication skills, and effort

Incomplete and Late Work

Work that is not adequately represented or fails to meet the minimum standards for completion may not be graded, presented or discussed. Late work will only be accepted with the permission of the instructor. Work submitted after the final day of classes is not acceptable without written permission from the Dean. Any late work accepted will be penalized 10% for the first day of lateness and 5% per day thereafter. The first day of lateness begins immediately after the deadline and include weekends. Extensions for medical or family emergencies must be requested immediately after the event and in advance of the deadline and must be supported by adequate documentation.

Computer Requirements and Guidelines

Students are required to provide and maintain their own computers for use during and after the class. Technical difficulties, viruses, crashes, server and printing problems, or corrupted files will not be accepted as legitimate excuses for performance failure. See the TSA's current student website for details: <https://architecture.tulane.edu/student-life/materials-policies>

Remote Instruction Expectations

It is expected that students will log in to the class multiple times each week and attend all live online Zoom sessions. If technology or scheduling problems prevent a student from attending,

notify the instructor and your TA immediately. Contact the Tulane Helpdesk for technical issues at 504-862-8888. Failure to attend discussion sessions may result in an unexcused absence or reduced participation credit.

Remote Instruction Etiquette

- Microphones should be turned on mute, unless asking a question or in discussion.
- Chat will be public comments only.
- Zoom username is your name on the course registration
- To ask a question use chat or “Raise Hand” in Zoom
- Include citation if referring to a specific point in the reading.
- Don’t repeat someone else’s post without adding to it
- Avoid using the “reactions” feature in Zoom
- Cell phones and other distracting, unnecessary electronic devices may not be used during class time. If you have an emergency situation and need to keep your phone on, please pre-arrange this with the instructor before the class begins.
- Be prepared for class with the proper books and materials. Please join synchronous sessions on time and ready to work.
- Be respectful to your fellow students and faculty in your words, actions, and deeds. Disrespect or harassment of any student or Tulane University employee, whether on or off-campus, will not be tolerated.
- Remain open-minded and welcoming of interaction with people who may have different viewpoints or cultural backgrounds.
- When working remotely for a course, expect to work hard. Programs will require students to complete asynchronous work.
- Assignments are expected to be completed on time.

Code of Academic and Student Conduct

The Code of Academic Conduct applies to all undergraduate and graduate students, full-time and part-time, in Tulane University. Tulane University expects and requires behavior compatible with its high standards of scholarship. By accepting admission to the university, a student accepts its regulations (i.e., Code of Academic Conduct and Code of Student Conduct) and acknowledges the right of the university to take disciplinary action, including suspension or expulsion, for conduct judged unsatisfactory or disruptive.

Civility in the Classroom

All individuals and/or groups of the Tulane University community are expected to speak and act with scrupulous respect for the human dignity of others, both within the classroom and outside it, in social and recreational as well as academic activities. By accepting admission to Tulane University, a student accepts its regulations and acknowledges the right of the University to take disciplinary action, including suspension or expulsion, for conduct judged unsatisfactory or disruptive. Any conduct of enrolled students that threatens the security of the University community, the rights of its individual members, or its basic norms of academic integrity will be subject to disciplinary action and possible dismissal from the program. The University community

extends to the remote teaching and learning space, and to official and unofficial engagement between students and staff related to the class in which they are enrolled. The same principles that apply to our academic and residential community standards carry over into the online environment. Behavior directed to a particular individual that compromises that individual's safety or ability to function with the University setting is prohibited and will be investigated by University officials. Students who violate community standards are subject to dismissal or expulsion. For further information, please refer to the code of student conduct on Tulane University website at: <https://conduct.tulane.edu/resources/code-student-conduct>

Plagiarism

As defined by the NTC Code of Academic Conduct, plagiarism is the “unacknowledged or falsely acknowledged presentation of another person's ideas, expressions, or original research as one's own work. Such use is defined as plagiarism regardless of the intent of the student. Students may, at times, be unsure of exactly what constitutes appropriate acknowledgement, particularly during their first years at the University, or when taking courses in disciplines outside of their major area of study.” For further information, please visit: <http://www2.tulane.edu/college/code.cfm>

Religious Accommodation Policy

Per Tulane's religious accommodation policy, the instructor will make every reasonable effort to ensure that students are able to observe religious holidays without jeopardizing their ability to fulfill their academic obligations. Excused absences do not relieve the student from the responsibility for any course work required during the period of absence. Students should notify me within the first two weeks of the semester about their intent to observe any holidays that fall on a class day or on the day of the final exam.

ADA/Accessibility Statement

Tulane University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability, please let the instructor know immediately to discuss options privately. Instructor will never ask for medical documentation from you to support potential accommodation needs. Instead, to establish reason-able accommodations, instructor may request that you register with the Goldman Center for Student Accessibility. After registration, make arrangements with the instructor as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. Goldman Center contact information: goldman@tulane.edu; (504) 862-8433; accessibility.tulane.edu.


Title IX

Tulane University recognizes the inherent dignity of all individuals and promotes respect for all people. As such, Tulane is committed to providing an environment free of all forms of discrimination including sexual and gender-based discrimination, harassment, and violence like sexual assault, intimate partner violence, and stalking. If you (or someone you know) has experienced or is experiencing these types of behaviors, know that you are not alone. Resources and support are available: you can learn more at allin.tulane.edu. Any and all of your

communications on these matters will be treated as either “Confidential” or “Private” as explained in the chart below. Please know that if you choose to confide in me, I am mandated by the university to report to the Title IX Coordinator, as Tulane and I want to be sure you are connected with all the support the university can offer. You do not need to respond to outreach from the university if you do not want. You can also make a report yourself, including an anonymous report, through the form at tulane.edu/concerns.

Confidential	Private
<i>Except in extreme circumstances, involving imminent danger to one's self or others, nothing will be shared without your explicit permission.</i>	<i>Conversations are kept as confidential as possible, but information is shared with key staff members so the University can offer resources and accommodations and take action if necessary for safety reasons.</i>
Counseling & Psychological Services (CAPS) (504) 314-2277 or The Line (24/7) (504) 264-6074	Case Management & Victim Support Services (504) 314-2160 or srss@tulane.edu
Student Health Center (504) 865-5255	Tulane University Police (TUPD) Uptown - (504) 865-5911. Downtown - (504) 988-5531
Sexual Aggression Peer Hotline and Education (SAPHE) (504) 654-9543	Title IX Coordinator (504) 314-2160 or msmith76@tulane.edu

Emergency Preparedness & Response

EMERGENCY NOTIFICATION SYSTEM: TU ALERT	RAVE GUARDIAN
<p>In the event of a campus emergency, Tulane University will notify students, faculty, and staff by email, text, and phone call. You were automatically enrolled in this system when you enrolled at the university.</p> <p>Check your contact information annually in Gibson Online to confirm its accuracy.</p>	<ul style="list-style-type: none"> Download the RAVE Guardian app from the App Store Communicate with dispatchers silently by selecting “Submit Tip” feature in the app Use the Safety Timer feature to alert your “guardian” (TUPD, family, friend) when travelling alone at night <p>For more information, visit publicsafety.tulane.edu/rave-guardian</p>
ACTIVE SHOOTER / VIOLENT ATTACKER	SEVERE WEATHER
<div style="text-align: center;">  <p>Tulane University EMERGENCY PREPAREDNESS & RESPONSE</p> </div> <ul style="list-style-type: none"> RUN – run away from or avoid the affected area, if possible HIDE – go into the nearest room that can be locked, turn out the lights, silence cell phones, and remain hidden until all-clear message is given through TU ALERT FIGHT – do not attempt this option, except as a last resort <p>For more information on Active Shooter emergency procedures or to schedule a training, visit emergencyprep.tulane.edu</p>	<ul style="list-style-type: none"> Follow all TU Alerts and outdoor warning sirens Seek shelter indoors until the severe weather threat has passed and an all-clear message is given Do not attempt to travel outside if weather is severe Monitor the Tulane Emergency website (tulane.edu/emergency/) for university-wide closures during a severe weather event

Makeup Schedule Due to Institutional Closure

In the event of a university closure due to an unforeseen occurrence (such as a major storm) that prevents in-person classes from being held, your instructor will communicate what changes, if any, there will be to the syllabus, assignments, and/or modes of instruction. Students are expected to check email and Canvas daily for these details in order to fulfill class requirements and are expected to keep up with class readings and assignments according to the schedule outlined in the syllabus and/or on Canvas.