

DCP 6221: ECONOMICS OF SUSTAINABILITY

Spring 2025 | 3 Credits

Instructor: Dr. Patricia Kio, LEED GA, MNIA

Program in Sustainability & the Built Environment (SBE), Construction and Planning (DCP) |
University of Florida.

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Office Hours: [Tuesdays](#) (12:00 PM –2:00 PM) and [Thursdays](#) (10:00 AM –12:00 PM)

Other times: By appointment (virtual & in-person)

Course Time & Location: Monday 9:35 AM – 11:30 AM | Wednesday: 9:35 AM – 10:25 AM at RNK 225 ([Rinker Hall](#))

Corequisite and/or Prerequisite: None

General Education Credit: None

Final Exam Schedule: No final exam for this course.

COURSE DESCRIPTION

This graduate course in the sustainability program explores the economic principles and practices that inform the built environment's sustainability efforts. Students will analyze the intersection of economic, social, and environmental factors influencing the design, operation, and maintenance of built environments, and develop key skills in assessing economic viability, measuring social impact, and prioritizing environmental concerns. This is a co-listed course, and two levels (graduate and undergraduate) are included in the same classes.

COURSE OBJECTIVES

- Develop a comprehensive understanding of economic principles and practices in the built environment
- Assess the economic viability, social impact, and environmental outcomes of sustainable built environment projects
- Apply innovation and entrepreneurship in sustainability practice
- Engage and participate with local stakeholders, policymakers, and experts in the sustainability sector
- Plan and implement sustainability projects in a built environment context.

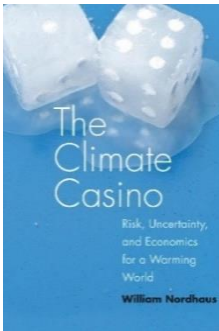
STUDENT LEARNING OUTCOMES (SLO)

- Upon completion of this course, the students will be able to:
- Understand the importance of sustainability and its relationship to economic growth, social welfare, and environmental protection.
- Identify the key factors contributing to sustainability, including human well-being, environmental quality, and economic efficiency.
- Analyze the market and non-market forces affecting environmental quality and ecological systems.
- Understand the concept of externalities and their impact on social welfare.
- Explain the concept of cost-benefit analysis and its application to environmental policy.
- Understand the different types of sustainability policies, including market-based instruments, command-and-control regulations, and hybrid approaches.
- Explain the pros and cons of each policy instrument, considering the economic, social, and environmental impacts.

REQUIRED TEXT/READING

Nordhaus, W. (2013). *The climate casino: Risk, uncertainty, and economics for a warming world*. Yale University Press.

In addition to the required textbook and recommended reading, other readings including book chapters, reports, and articles from academic journals and industry magazines will be assigned throughout the semester. Students are expected to complete readings as advance preparation for class discussions and project goals.



INSTRUCTIONAL METHODS AND EXPECTATIONS

This course includes lectures, readings and reflections, multimedia materials, in-class engagement activities (individuals and groups), research/writing, and two projects. The following is a summary of expectations:

- Student expectations of instructor: enthusiasm for the course; engaging lectures; application of knowledge through classroom activities and fieldwork; easy to access course materials; clear guidance and assessment rubric; openness and encouragement of critical thoughts and new ideas; constructive feedback, and reasonable flexibility to meet with students outside of class.

- Instructor expectations of students: compassionate curiosity; positive attention and intention; enthusiasm about learning new ideas and contribution to the learning environment, consistent attendance; punctual arrival; active participation in class discussions and activities; advance-reading and note preparation of assigned reading; on-time completion/submission of all assignments; proper citation management; professional attitude, adherence to proper netiquette and all University rules and regulations.

COURSE COMMUNICATIONS AND E-LEARNING/ CANVAS PORTAL

This class will be delivered through hybrid instructions. The instructor will utilize the UF Canvas e-Learning portal as the primary medium to send announcements and to distribute course information, assignments, reading materials, resources, and grading. Students are responsible for checking Canvas portal regularly for announcements, course content, access to all supplemental readings, and to submit assignments and projects. Readings and changes to the syllabus will also be posted on Canvas. Lecture slides will be posted on Canvas in advance of each scheduled lecture. Reviewing materials online is not a substitute for class attendance. Lectures posted on Canvas by the instructor are not intended to be a complete study aid and should be viewed as supplementary to personal notes.

METHODS BY WHICH STUDENTS WILL BE EVALUATED OUT OF 1000

	Item	Points & Percentage	Description	Deadlines
1.	Attendance	50 (5%)	Regularly attend classes according to university policies	Every class
2.	Discussions	100 (10%)	Contribute to discussion threads on Canvas	Every class
3.	Reading presentation	100 (10%)	Students sign up for two reading presentations of sections of book chapters using template .	Textbook sections
4.	Assignments	250 (25%)	Ten assignments to be uploaded on Canvas	See rubric and schedule below
5.	Research paper	300 (30%)	Research Paper – Fort Jefferson , Key West, Florida	April 23
6.	Quizzes	200 (20%)	Four quizzes of ten questions (Open book online via canvas)	Quiz 1- Feb 3 Quiz 2 - Feb 17 Quiz 3 – Mar 10 Quiz 4 – Mar 31
	Total	1000(100%)		

ATTENDANCE

Attendance will be kept. Students are expected to attend classes regularly. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

DISCUSSION SCALE

Your participation in class discussions will be evaluated using this percentage scale for points towards your final grade for the semester.

1. 100 = Student often contributes thoughtful comments and insights based on class materials and has been a catalyst for other student comments as well as instructor response; listens to the comments and insights of others with respect and attention.
2. 80 = Student regularly contributes thoughtful comments and insights based on class materials, which results in student as well as instructor response; listens to the comments and insights of others with respect and attention.
3. 60 = Student sometimes contributes comments and insights based on class materials, more often at instructor's prompting; generally polite but could be more engaged in class discussions.
4. 40 = Student seldom contributes comments and insights of her/his own volition; comments are not always relevant to materials or discussion at hand; needs to pay more attention to the contributions of the instructor and peers.
5. 0 = Student rarely and reluctantly contributes to class discussions; comments minimal and/or disrespectful; often noticeably disinterested in instructor's and peers' contributions.

READING PRESENTATIONS

Students will pair up and summarize two course readings from the textbook. Students [sign up](#) for the two reading presentations of sections of book chapters using [template](#). The presentation time is about 15-20 minutes.

ASSIGNMENTS

The grades for the ten assignments will be based on the quality and completeness of work, the clarity and rigor of your ideas, and your contribution to the ongoing public dialogue that is integral to the practice of sustainability. Day-to-day interactions in class and during presentations are noted and will have a significant impact on your final grade. Interim grades will be issued and will include comments on progress to that point. If you have questions at any point, make an appointment to meet with the faculty instructor. The assignments will be graded with this [rubric](#).

RESEARCH PAPER

Students will complete a research paper (4000 words minimum) on Sustainability and Eco-tourism at Fort Jefferson, Key West, Florida. Details about the format and citations will be made available on Canvas. Both the proposal and paper must be submitted online. Plagiarism will result in a grade of 0

(this includes self-plagiarism). Students agree that by taking this course all required papers may be subject to submission for a textual similarity review to Turnitin.com via Canvas for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site. Students who do not agree should contact the course instructor immediately.

The maximum Turnitin similarity index report of submissions is 20% and the research paper will be graded with this [rubric](#). Groups will present their research paper to the class during the last month of class. The presentation should be 15-20 minutes long.

QUIZZES

Quizzes will be made available on Canvas and they are open book. Students are expected to take quizzes individually and not collaborate with others. There will be 4 quizzes worth 50 points each. Each quiz comprises 10 questions and the quizzes are non-cumulative.

GROUP WORK RULES

Students will work in teams on Project 2 with folders in OneDrive. The instructor will create folders for each group and check the log for the documents to assess individual contribution to the group project. Each student will complete an allocated task that contributes to the final project and get the grade for that task. In addition, team members will complete a peer evaluation form for group processes. The contribution of team members will be assessed with this [rubric](#).

GRADING

Grading Scale

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
93-100	90-92.99	87-89.99	83-86.99	80-82.99	77-79.99	73-76.99	70-72.99	67-69.99	63-66.99	60-62.99	0-59.99
4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	0.67	0.0

OTHER IMPORTANT COURSE INFORMATION

Late Work Policy

Students are to present a legitimate reason for late work. There will be a deduction of 10% of the points for every day that work is late. The maximum deduction is 50%. This is to be fair to other students who turned in their work by the deadline. Once Canvas assignment closes, we do not accept any assignments, unless you have a legitimate reason for late or missed work.

Classroom Etiquette

Talking to each other and disrupting the class violates your fellow students' right to have a good learning experience in the class. If a student must say something to another person or persons besides the instructor, that student is free to leave the room. Students need to be considerate that others must be able

to hear the instructor clearly without being disturbed by unnecessary conversations or disruptions. Cell phones and all noise-making devices must be silent during class times as well. Cell phones and all noise-making devices must be silent during class times as well.

Email Policy

E-mail is appropriate only for quick messages and replies. You are welcome to e-mail me with brief questions or comments (e.g., a request for an appointment, a question that can be answered in a sentence or two). I will answer your messages as I have the opportunity but cannot guarantee immediate responses. Note also that e-mail messages (particularly last-minute e-mail messages) cannot be accepted as fulfilling class obligations or providing excuses for failing to do so.

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://disability.ufl.edu/> by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with any disability should follow this procedure as early as possible in the semester.

University of Florida Student Honor Code, Original Work, And Plagiarism

UF students are bound by The Honor Pledge which states “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the [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.” The Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. See the [UF Conduct Code website](#) for more information. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Course Evaluation

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 they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>

Materials and Supplies Fee

There are no additional fees for this course.

COURSE MODULES AND TOPICS

Detailed weekly plans, readings, quizzes, and course content will be available on Canvas throughout the semester and will be announced in class.

Semester Schedule (subject to modification)

<i>Week / Dates</i>	<i>Lecture Topics / Questions addressed</i>	<i>Assessment</i>
January 13	<ul style="list-style-type: none"> ● Introduction to Economics in Sustainability ● Overview of economic principles in sustainability ● The role of economics in the built environment ● Key sustainability metrics and indicators 	<p><u>Sign up</u> for reflections from textbook – <i>The climate casino: Risk, uncertainty, and economics for a warming world</i>.</p> <ul style="list-style-type: none"> ● Discussion 1 (7 points), Part I (Page 1 - 23) ● Assignment 1: Sustainable Development Goals
January 20	<ul style="list-style-type: none"> ● Economic Systems and Sustainability ● Macroeconomic and microeconomic perspectives on sustainability ● The role of markets and governments in promoting sustainability ● Case studies: economic instruments for sustainability in the built environment 	<ul style="list-style-type: none"> ● Discussion 2 (7 points), Part I (Page 24 - 45) ● Assignment 2: Data inquiry for existing economic conditions with ArcGISOnline
January 27	<ul style="list-style-type: none"> ● Valuing Sustainability in the Built Environment ● Traditional and innovative methods for valuing sustainability ● Environmental Economic Accounting (EEA) and its applications ● Measuring and monitoring sustainability performance 	<ul style="list-style-type: none"> ● Discussion 3 (7 points), Part I (Page 46 - 66) ● Assignment 3: Case studies from literature review sessions on January 27, with Ann Baird – AFA conference room
February 3	<ul style="list-style-type: none"> ● Green Finance and Investing ● Overview of green finance and green investing ● Green bonds and other financial 	<ul style="list-style-type: none"> ● Quiz 1 (50 points) ● Discussion 4 (7 points), Part II (Page 1- 29) ● Assignment 4: Systems

	<p>instruments</p> <ul style="list-style-type: none"> ● Case studies: green financing in the built environment 	<p>thinking with loopy</p>
February 10	<ul style="list-style-type: none"> ● Sustainable Business Models and Urban Regeneration ● Sustainable business models in the built environment ● Urban regeneration and its economic benefits 	<ul style="list-style-type: none"> ● Discussion 5 (7 points), Part II (Page 30 - 53) ● Assignment 5: Project environmental analysis with Autodesk forma.
February 17	<ul style="list-style-type: none"> ● Case studies: community-led regeneration and co-production of public spaces ● Social-Economic-Environmental Interactions in the Built Environment ● An integrated approach to sustainability metrics and indicators 	<ul style="list-style-type: none"> ● Quiz 2 (50 points) ● Discussion 6 (7 points), Part II (Page 54 - 80) ● Assignment 6: Provide two options to promote ecotourism at Fort Jefferson
February 24	<ul style="list-style-type: none"> ● Measuring social impact and environmental outcomes ● Exploring interdependencies and feedback loops between social, economic, and environmental components ● Policy and Regulation for Sustainable Development 	<ul style="list-style-type: none"> ● Discussion 7 (7 points), Part III (Page 1 - 24) ● Assignment 7: Material flows with Sankey diagram
March 3	<ul style="list-style-type: none"> ● Policy and regulatory frameworks for sustainability in the built environment ● Best practices and lessons from around the world ● Case studies: effective policy and regulatory frameworks for sustainability Community Engagement and Co-Production in Sustainability 	<ul style="list-style-type: none"> ● Discussion 8 (7 points), Part III (Page 25 - 48) ● Assignment 8: Project proposals with Autodesk forma.
March 10	<ul style="list-style-type: none"> ● Community-led approaches to sustainability planning and implementation ● Co-production and participatory approaches to urban planning ● Social impact assessment and community engagement tools 	<ul style="list-style-type: none"> ● Quiz 3 (50 points) ● Discussion 9 (7 points), Part IV (Page 1 - 25)

March 17	Spring Break	
March 24	<ul style="list-style-type: none"> • The Future of Work in Sustainability: Emerging Trends and Innovations • Emerging technologies and innovations in sustainability • Impacts of automation and digitalization on the built environment workforce • Research Paper – Fort Jefferson, Key West, Florida. How to write a research paper 	<ul style="list-style-type: none"> • Discussion 10 (7 points), Part IV (Page 26 - 49) • Assignment 9: Transfer proposal from Autodesk forma to Revit and implement proposals in Revit. • Instructor will provide Revit model of existing building.
March 31	<ul style="list-style-type: none"> • New work models and cooperative ownership structures in sustainability • Analysis of case studies in economics of sustainability • Evaluation of the economic implications of different sustainability strategies and technologies 	<p>Quiz 4 (50 points)</p> <ul style="list-style-type: none"> • Discussion 11 (7 points), Part IV (Page 50 - 73) • Virtual reality sessions in Revit to compare immersive experience of existing and proposed materials.
April 7	<ul style="list-style-type: none"> • Development of strategies for integrating economic principles into sustainability decision-making in practice • Design of economic-based sustainability metrics and performance metrics 	<ul style="list-style-type: none"> • Discussion 12 (7 points), Part IV (Page 74 - 96) • Calculating impacts with WARM tool for research paper.
April 14	<ul style="list-style-type: none"> • Evaluation of the effectiveness of sustainability metrics and performance metrics • Evaluation of course effectiveness and impacts • Recommendations for further learning 	<ul style="list-style-type: none"> • Discussion 13 (8 points), Part V (Page 1 - 21) • Reporting economic impacts with sample template for research paper.
April 21	<ul style="list-style-type: none"> • Review of course materials and objectives • Project completion 	<ul style="list-style-type: none"> • Discussion 14 (8 points), Part V (Page 22 - 36)
April 23	<ul style="list-style-type: none"> • Final presentations of research paper 	

April 28	<ul style="list-style-type: none"> • Final uploads of research paper 	
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The final research paper presentations will take place on the last day of classes. The final assignments/presentations do not serve as a final exam and final work will be submitted during exam week.

CAMPUS RESOURCES

- Health and Wellness U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or 352-392-1575 so that a team member can reach out to the student.
- Counseling and Wellness Center: <https://counseling.ufl.edu/>, 392-1575 Sexual Assault Recovery Services (SARS): Student Health Care Center, 392-1161.
- University Police Department: 392-1111 (or 9-1-1 for emergencies). <http://www.police.ufl.edu/> UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the [UF Health Emergency Room and Trauma Center website](#).
- Academic Resources E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learningsupport@ufl.edu. Visit the website at <https://training.it.ufl.edu/services/elearning-tools--services/>
- Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling. <https://career.ufl.edu/>
- Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.
- Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <http://teachingcenter.ufl.edu/>
- Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <http://writing.ufl.edu/writing-studio/>
- On-Line Students Complaints: <https://distance.ufl.edu/student-complaint-process/>

PROJECT FOR RESEARCH PAPER– SUSTAINABILITY AND ECO-TOURISM FOR THE FLORIDA GULF COAST

Future Tourism for Fort Jefferson – Gulf of Mexico



Photo: Courtesy of State Archives of Florida, Florida Memory Photo: Trulia.com

Fort Jefferson is currently under repair due to damage from the hurricanes in 2024, Hurricane Ian in 2022, and Hurricane Irma in 2017. The entire moat wall has been closed for repair and strengthening until Fall 2026. The Garden Key Harbor Light has been extinguished due to repairs and it is unknown when the light will again be illuminated. Thirdly, there has been increase in the number Cuban migrants arriving by boat.

Students' approach includes assessing the impacts of current damage and proposing sustainable solutions for thriving eco-tourism at Fort Jefferson.

The project amplifies the voice of the University of Florida by providing a framework to promote sustainability and eco-tourism for the case study area and other coastal regions. Thereafter, a comparative economic impact assessment of two scenarios (existing versus proposed) that focuses on spatial experience and materials in the structure as immersive design review that applies virtual reality (VR) expedites the improvement of students' scale feeling.

The project explores sustainable strategies from interdisciplinary research initiatives and their resulting economic impacts.

The challenges at Fort Jefferson will be the basis of analyzing material flows, ecological footprints and resource management to enhance eco-tourism and socio-economic growth in a sustainable manner.

The innovative use of digital technologies includes the following tools- Autodesk Forma, Autodesk Revit and immersive virtual reviews with Twinmotion.

Research question: How does the Florida Gulf Coast Region recover and adapt for future conditions?

Requirements:

- 1. Place-based learning-** Focus on sites, communities, or regions in the Florida Gulf Coast.
- 2. Community engagement-** Integrate strategies like fieldwork, interviews, dialogues, or collaborative projects with community stakeholders.
- 3. Geospatial relevance-** Include a digital, geospatial component in course outputs.
- 4. Interdisciplinary approach-** Encourage collaboration across departments or disciplines. (Team members are from different disciplines)
- 5. Event participation-** Students are required to be involved in the three collective events scheduled during the semester:
 - i) kickoff meeting - Fri, Jan 17, 2025, at 4:00-6:00pm
 - ii) mid-semester invited lecture (Mar)
 - iii) final exhibition (Apr)
- 6. *Final Exhibition-**Present course outcomes during the end-of-semester exhibition, which will bring together stakeholders, students, faculty, and NASEM GRP representatives.