DCP 6227/DCP 4930 | 3 Credits

Life Cycle Assessment of Sustainable Buildings

Spring 2026

Instructor:	**Patricia Kio, Ph.D., MNIA, INT'L ASSOC. AIA, LEED AP, CM-LEAN, WELL AP** **Assistant Professor Architecture | SBE Research Faculty** College of Design, Construction and Planning (DCP) | University of Florida
Class Correspondence:	Phone: 352-294-1425 (Kio) Email: p.kio@ufl.edu Messaging through Canvas is preferred
Course Time & Location:	**DAY** | M **PERIOD** | 6 **TIME** | 12:50 PM - 1:40 PM **LOCATION:** Rinker 0220 & Online
	DAY | W **PERIOD** | 6 – 7 **TIME** | 12:50 PM - 2:45 PM **LOCATION:** Rinker 0220 & Online
Course Co/Prerequisite:	Junior standing or higher (student should have completed at least 60 semester credit hours)
Final Exam Schedule:	N/A
Instructor Office hours:	**Kio:** Monday & Wednesday 9:00-11:00 AM **ZOOM** or by appointment at Antevy Hall Room 132
Course Website:	https://ufl.instructure.com/courses/555613 for modules, announcements, assignments, discussions, lecture slides, readings, practice quizzes, and grades

Catalog Description

Students gain an in-depth understanding of Life Cycle Analysis (LCA) and its applications in the built environment. Students will learn to evaluate the environmental impacts of building materials, construction processes, and building operations from an LCA perspective. The course emphasizes the importance of LCA in promoting sustainable building practices and decision-making. This is a co-listed course, and two levels (graduate and undergraduate) are included in the same classes.

Course Objectives

- Identify the principles and methodology of LCA.
- Apply LCA to evaluate the environmental impacts of building materials and processes.
- Explain LCA results to inform sustainable design and construction practices.
- Develop skills to conduct LCA studies and communicate effectively.

Student Learning Outcomes (SLOs)

Upon completion of this course, the students will be able to:

- Recognize the importance of LCA in evaluating the environmental impacts of products and processes.
- Describe the key stages of the life cycle (Raw Material Extraction, Production, Use, End-of-Life) and their associated environmental impacts.
- Practice the principles of Life Cycle Inventory (LCI) and its utility in tracking material and energy flows associated with products.
- Calculate and interpret LCI databases and evaluate the accuracy of LCI data.
- Explain the differences between midpoint and endpoint approaches in LCIA.
- Evaluate the environmental impacts of products and processes through impact categories (e.g., climate change, eutrophication, human toxicity).

Required Text/Reading

- Pati, S. N. (2022). Life Cycle Assessment: Future Challenges. CRC Press.

Recommended Readings:

- Curran, M. A. (2020). Life-cycle Assessment: Inventory Guidelines and Principles. CRC Press.
- Automate the Boring Stuff

Students are expected to complete reading reflections on Perusall for class discussions and project goals.

Course Requirements

Students must actively engage in the LCA process and work individually, within groups, and with instructors throughout each project. The role of faculty members in this course is to coach, facilitate, and offer advice in reaction to work produced by the individual student/teams. To ensure student progress, it is essential that you complete the stated requirements for each LCA project plus all the associated tasks assigned by the instructors on the respective due dates and times.

To learn the skills required to undertake LCAs and produce high-quality documents. The specific goals are derived from the ISO 14040 / ISO 14044 Standards including, but not limited to, the following:

Goal definition: Clarify purpose, stakeholders, and use of results (ISO 14040)
Functional unit: Ensure accurate, comparable measurement.
System boundaries & assumptions: Establish what is included and excluded.
Methodological rigor: Follow standardized rules for data, impacts, allocations, and weighting.
Transparency & comparability: Enable reliable comparisons through consistent documentation and optional critical review.

Support decision-making & sustainability: Identify environmental trade-offs, optimize performance across life cycles.
Leverage digital tools and integrated management: Enhance data integrity, align with broader organizational strategies.
This course is funded and supports Resilient Urban Design as part of the GulfSouth Studio (GSS) initiative supported by the National Academies of Sciences, Engineering, and Medicine (NASEM) Gulf Research Program

One Click LCA

This course includes two major projects that will be conducted using One Click LCA, a leading cloud-based tool for LCA, and carbon footprint analysis. Students will gain hands-on experience applying LCA principles to real-world scenarios, learning how to model environmental impacts across the entire life cycle of products or systems.

To get started, visit https://www.oneclicklca.com and sign up using your university email address. After creating your account, log in and navigate to Projects → Join Project/Class, then enter the Class Code provided by your instructor to access the course workspace. More instructions and training resources for One Click LCA will be provided during the first week of class. AutoCAD and Autodesk Revit are the course's building information modeling (BIM) tools.

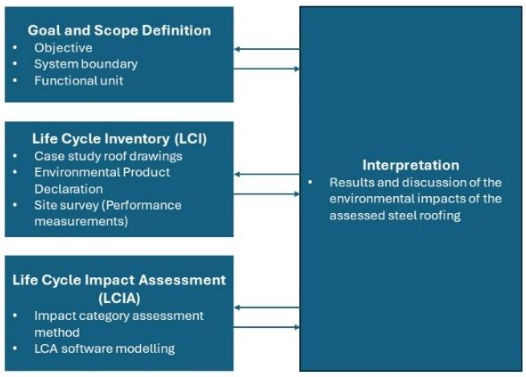
Course Grades

Grades are based on the completion of a series of assignments (a percentage is presented representing the assignments portion of the overall course grade). More detail for each assignment and a grading rubric will be further explained in separate handouts.

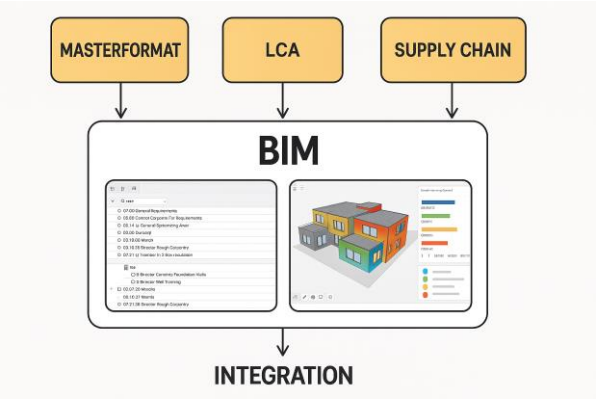
	Item	**Points (Percentage)**	**Description**	**Due dates**
1	Attendance	100 (10%)	Regular class attendance	Every class
2	Participation Exercises in class leading to homework	150 (15%)	During classes	Weekly
3	Homework (Reading Reflections + Exercises)	200 (20%)	Perusall	On Canvas
4	Project 1	200 (20%)	Dickinson building, Metal roof	3/04 (3 weeks)
5	Project 2	200 (20%)	GulfSouth Studio, Homosassa, FL	4/22 (6 weeks)
6	Quizzes (Open book)	150 (15%)	2 quizzes Undergrad 3 quizzes Graduate students	• 1/28 • 2/18 • 3/26
	Total	1000 (100%)		

Project Goals

Projects will be guided by the LCA frameworks below.



a) LCA stages



b) Course focus (No prior knowledge of BIM required)

The LCA system boundaries will integrate five of the ten WELL concepts: Air, Nourishment, Thermal Comfort, Materials, and Community.

WELL Concept	**Standard**
Air	WELL v2, WHO
Nourishment (Garden)	WELL v2
Thermal Comfort	WELL v2
Materials	WELL v2, SAMPL, EC3
Community	WELL v2

Project 1: Building scale; Dickinson Building, UF – (Individual Project) 20%

For your individual project, you will evaluate the operational Life Cycle Assessment (LCA) of a campus building, integrating empirical data with simulation tools. This research will deepen your understanding of the environmental performance of building elements, especially metal roofing systems. Each student will present findings in a poster format. Poster templates will be provided on Canvas to guide your design and ensure consistency.

Project 2: City scale: GulfSouth Studio Program - LCA for a Resilient and WELL Homosassa, FL (Team Project) 30%

Student teams will collaborate on a consequential Life Cycle Assessment (LCA) of urban design strategies aimed at improving resiliency and wellness in the Homosassa community. Each group will submit a report (minimum of 4,000 words) and a set of presentation slides (PowerPoint or similar). The presentation should be 15–20 minutes and summarize key findings, methodology, and recommendations. Templates for both the report and slides will be provided on Canvas.

Students enrolled in the courses should participate in three events over the Spring 2026 semester: 1) kickoff meeting in January; 2) mid-semester invited lecture(s); and 3) final presentations. This will build a broader student body engagement and support dialogue across students' disciplines.

Final Report

Student teams will complete a final report (4000 words minimum) on Project 2 to be submitted on Canvas. You are welcome to submit earlier than the deadline. 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 reports 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 report will be graded with this rubric.

Group Work Rules

Students will work in teams using folders in OneDrive. The instructor will create folders for each group and check the log for the documents to assess individual contributions to the group project. Each student will complete an allocated task that contributes to the group's final outcomes and gets the grade for that task. In addition, team members will complete a peer evaluation form. The last page of your report should be titled "Group work," where you will submit a list of all your team members and state each team member's contribution.

Grading

The scale for letter grades is as follows:

Letter Grade	**A**	**A-**	**B+**	**B**	**B-**	**C+**	**C**	**C-**	**D+**	**D**	**D-**	**E**
Range	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	59.99 & below
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

Policies

Item	**Policy**
Course/Syllabus	The following university-level academic policies and campus resources supersede any information provided in this syllabus: https://go.ufl.edu/syllabuspolicies
Provide Constructive Feedback	Students - Faculty Evaluations - University of Florida
Course Evaluation	https://my-ufl.bluera.com/
Attendance	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/

Grading	https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/
Honor Code	Student Honor Code and Student Conduct Code – Regulation and Policy Hub
Conduct Code Process	Conduct Code Process | SCCR
Accommodations	Accommodations - DISABILITY RESOURCE CENTER
Counselling	Homepage - UF Counseling and Wellness Center (CWC)
Emergency	UF Health Shands Emergency Room / Trauma Center - UF Health
Writing Studio	https://writing.ufl.edu/writing-studio/
Library Support Undergrad	https://uflib.ufl.edu/using-the-libraries/library-support-services-for-undergrads/
Writing Support	https://writing.ufl.edu/writing-studio/for-students/writing-assistance/
Career Connections	https://career.ufl.edu/

Class Field Trips

Some class field trips may take place outside of the scheduled studio hours. All students are required to attend.

Work Products

All work produced in class is the property of the University of Florida College of Design, Construction, and Planning. Instructors may elect to keep samples of student work for accreditation purposes.

Preliminary Course Schedule Spring 2026

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

WK	DAY	DATE	CLASS SCHEDULE	DUE ITEMS
1	M	1/12	**Introduction to LCA** Definition and importance of LCA Historical development and standards	
	W	1/14	**LCA framework** ***Intro Project 1***: Building scale Metal Roof LCA Intro: One Click LCA	HW1
2	M	1/19	MLK Holiday	
	W	1/21	***Guest Lecture***: Lisa Sundahl Platt, PhD | UF DCP Interior Design | Title: Orientation on Sustainable Adaptive Material Performance Level (SAMPL)	HW2

3	M	1/26	Environmental Management System International Standards	
	W	1/28	***Guest Lecture***: Jason Forster, U.S. National Sales Manager; Unicel Architectural & AD Systems Brands Title: Use of Glass, Aluminum and Timber in Construction.	Quiz 1
4	M	2/2	Field Trip: San Felasco Tech City (10:00 – 11:30 AM)	
	W	2/4	***Guest Lecture***: Ann Baird, Library Resources for Projects (LCA Framework Development & WELL Concepts)	HW3
5	M	2/9	Data Collection and Inventory Analysis	
	W	2/11	Impact Assessment Methods Classification and characterization / Framework Development	HW4
6	M	2/16	LCA Software and Tools	
	W	2/18	***Guest Lecture:*** A Myat, Graduate Student Title: Classification of Roof Types Using a Machine Learning Model I	Quiz 2
7	M	2/23	LCA in Building Materials	
	W	2/25	***Guest Lecture:*** A Myat, Graduate Student Title: Classification of Roof Types Using a Machine Learning Model II	HW6
8	M	3/2	LCA in Construction Processes	
	W	3/4	**Midterms**: Project 1 Poster Presentation	Project 1
9	M	3/9	LCA in Building Operations **Intro Project 2**: GulfSouth Studio Program - LCA for a Resilient and WELL Homosassa, FL	
	W	3/11	Operational energy and water use / Framework Development	HW7
10			Spring Break	

11	M	3/23	Policy and Regulation	
	W	3/25	Incentives for LCA adoption	Quiz 3
12	M	3/30	Life Cycle Interpretation	
	W	4/1	Sensitivity and consistency check	HW8
13	M	4/6	Case Studies and Best Practices	
	W	4/8	Final Project Review	HW9
14	M	4/13	Future Trends and Opportunities	
	W	4/15	Advances in LCA methodology and tools	HW10
15	M	4/20	Final report review and upload	
	W	4/22	Final presentations for Project 2	Project 2
	F	5/1	Commencement	