UNIVERSITY OF FLORIDA – College of Design Construction and Planning
School of Architecture- Fall 2025

ARC 4494C Integrated Building Technology 4

SYLLABUS

GENERAL COURSE INFORMATION:

Course times:	R | Period 9-10 (Lecture) and W, F | Period 3 (Lab)
Total Credits:	3
Prerequisites:	Completion of: 3493C IBT3
Class Room:	FAB 103 (Lecture) TBD (Lab)
Modules and Instructors:	Digital Media Module (weeks 1-7): Faculty: Mani Karami Office: Zoom, by email appt. Contact: maniarch@ufl.edu Office Hours: Tues, 10 am-12 pm Environmental Design Module (weeks 8-15): Faculty: Hassan Azad Office: ARC 230 Contact: h.azad@ufl.edu Office Hours: WF 10:30-11:30
Graduate Teaching Assistants:	Kyle Koehne (kylekoehne@ufl.edu) Andrew Haines (a.haines@ufl.edu)

COURSE DESCRIPTION:

This course emphasizes the development of digital design and environmental design skills applicable to large-scale building projects. It focuses on both the technical aspects of macro-scale design drivers and the detailed implications of environmental performance and building assemblies.

COURSE RATIONALE AND PLACEMENT:

As the fourth and final course of an integrated building technology sequence, the course is intended to build upon the knowledge of the previous courses in scope and ambition. By teaching these topics as a series of inter-related modules with hands-on learning laboratory assignments, students are expected to learn the important technological information associated with each topic, to see sustainable design connections across modules, and to develop a facility in integrating these ideas into their design studio projects. The course is taught in conjunction with Design Studio 7, for which it is indented to compliment and reinforce in design objectives with technical knowledge and testing, as well as reinitiate a technical framework of detail for Design Studio 8 the following spring semester.

COURSE OBJECTIVES:

Digital Media (Module 1)

Taught in conjunction with the Design 7 studio, these two modules build upon previous coursework in Digital Technology and introduce intermediate to advanced topics in parametric design. The course covers 2D and 3D digital fabrication basics, including laser cutting, CNC machining, and 3D printing. It also addresses current trends in architectural design, such as SubD modeling, advanced digital simulation, form-finding, and optimization. The modules culminate in a project that combines and integrates the design and fabrication methods covered.

Environmental Design (Module 2)

This module addresses critical issues associated with large-scale building systems and their detail design implications. Experiences of artificial lighting and acoustical systems are introduced and exercised through design problems, as well as environmentally responsive assessments of building systems, and assemblies with regards to

acoustic, artificial light, and energy use. The complementary module will build upon the previous prerequisite course knowledge in the testing and refinement of building performance and façade assemblies, with the intent of addressing the effects of environmental factors taught in the previous integrated building technology courses on a large-scale single project.

COURSE TEXTS AND READINGS:

Digital Media (Module 1):

Required Texts:

No required texts. However, for the digital fabrication model group work, a 1-month Fab Lab laser membership will be required. 3D printing costs will be charged based on the project and time usage.

Required Software:

Rhino + Grasshopper

Environmental Design (Module 2)

Recommended Texts:

Mechanical and Electrical Equipment for Buildings; 13th Edition; Walter Grondzik and Alison Kwok; Wiley; 2019; IBSN 978-1118615904 (Available online at UF George A. Smathers Libraries)

Auditorium Acoustics and Architectural Design 2nd Edition, Michael Barron, Spon Press, 2009. (Available at UF Architecture & Fine Arts Library)

Architectural Lighting 2nd Edition, M. David Egan, Victor Olgyay, McGraw Hill, 2001. (Available at UF Marston Science Library)

WEEKLY COURSE SCHEDULE: (tentative – dates and/or content may be subject to change)

	Week	Date	Readings	Class topic
Digital Media	1	8/21	Lecture notes	Intro to IBT4 - Digifab Proj. Intro Group / Orientation Allocation
		8/22	N/A	No Lab
	2	8/27	Lab notes	Digifab Proj.: Review Part 1
		8/28	Lecture Notes	Fabrication Precedents FabLab Orientation-Lecture
		8/29	Lab notes	In Lab: HW#1 Work Session
	3	9/3	Lab notes	Fabrication Automation
		9/4	Lecture notes	Fabr. techniques: 3D Printing GH Intro / Practice
		9/5	Lab notes	In Lab: HW#2 Work Session
	4	9/10	Lab notes	Digifab Proj.: Review Part 2
		9/11	Lecture notes	Volumetric/Cellular SubDivision Voronoi Complex Surface Subdivisions
		9/12	Lab notes	Volumetric Cell Subdivision Surface MorphBox
	5	9/17	Lab notes	Digifab Proj.: Review Part 3

		9/18	Lecture notes	SubD in Rhino SubD Exercise Zaha Hadid Precedents - Part 1
		9/19	Lab notes	Cont. Digifab Proj.: Review Part 3 SubD Modeling Exercise
	6	9/24	Lab notes	Digifab Proj.: Review Part 4 In Lab: HW#5 Work Session
		9/25	Lecture notes	Zaha Hadid Precedents - Part 2 Digital Simulation Kangaroo Physics Active Structures
		9/26	Lab notes	Cont. Digifab Proj.: Review Part 4 Cont. In Lab: HW#5 Work Session
	7	10/1	Lab notes	Digifab Proj.: Review Part 5
		10/2	Lecture notes	Strip Morphologies and Shifting Biomimicry Weaverbird Mesh Relaxation
		10/3	Lab notes	Cont. Digifab Proj.: Review Part 5 Strip Morphology

Environmental Design	Week	Date	Readings	Class topic
	8	10/8	N/A	No Lab
		10/9	Lecture Notes	Revisiting Light Measures Lumens, Illuminance, Candela
		10/10	Lab notes	Lamp Design Introduction
	9	10/15	Lab notes	Lamp Concept Design - HW#1
		10/16	Lecture Notes	Fundamentals of Electrical Systems Ohms Law, Electrical Circuits
		10/17	Homecoming Holiday – No Labs	
	10	10/22	Lab notes	Lamp Design Context and Specs - HW#2
		10/23	Lecture Notes	Lamp Wiring Workshop HLB Lighting Design Lecture
		10/24	Lab notes	Lamp Design Context and Specs Review
	11	10/29	Lab notes	Lamp Design Craft - HW#3
		10/30	Lecture Notes	Guest Lecture on Lamp Design Revisiting Acoustical Measures
		10/31	Lab notes	Lamp Design Craft Review
	12	11/5	Lab notes	Lamp Design Install
		11/6	Lecture Notes	Environmental Acoustics I – Fundamentals Guest Lecture on Acoustic Design
		11/7	Lab notes	Acoustic Project - Phase 1

	13	11/12	Lab notes	Acoustic Project - Phase 1 Review
		11/13	Lecture Notes	Environmental Acoustics II Descriptors & Metrics
		11/14	Lab notes	Acoustic Project - Phase 2
	14	11/19	Lab notes	Acoustic Project - Phase 2 Review
		11/20	Lecture Notes	Acoustic Visit to the School of Music Acoustic Measurement Workshop
		11/21	Lab notes	Acoustic Project - Phase 3
	15	11/24	Thanksgiving Holiday Week – No Classes	
	16	12/3	Design Reviews – No Classes	
		12/4	Reading Days – No Classes	
		12/5	Reading Days – No Classes	
	17	12/8	Exams Week	

COURSE EVALUATION

Students will be responsible for the material in the reading assignments as well as the course lectures and laboratory sessions. There will be a range of project assignments and may include both individual and group work. Assignments will ask students to apply knowledge of class material in two potential forms; topic-specific lab assignments relative to direct coursework and synchronous assignments that complement concurrent, studio-based design projects.

- Module 1 (Digital Media) assignments will expand on the fundamentals of parametric design methodologies and typical digital fabrication paradigms, including 3D printing and laser cutting. The module will explore the relationships between these technologies and their applications in preliminary design and construction logic. Students will complete specific assignments and/or workshops. The module includes a targeted project with two milestones: a Preliminary Digital Model due in week 5 and a Final Physical Fabrication Model due in week 8. This project will integrate materials, joinery, design, fabrication, and other relevant aspects of the Digital Media module.
- Module 2 (Environmental Design) will examine how fundamental relationships are between environment, context, and design thinking/response through targeted assignments and/or projects. Module 2 assignments will include a comprehensive lamp design project/competition that models and analyzes lighting systems and their surrounding environment. It will also include an acoustic project that explores architectural acoustic design issues through measurements and design practices through 3 homework assignments. Module 2 includes no exam.

Each module will be graded individually. These grades will contribute to a cumulative course grade. The semester grade will be based on the following breakdown relative to content modules and final project:

Digital Media Module: 45%

6x Lab Assignments/HW	19%
Digifab: Digital Progress / Physical Sketch Model	2%
Digifab: Preliminary Digital Model/Board	8%
Digifab: Final Physical Fabrication Model/Board	16%

Environmental Design Module: 45%

Lamp Design Project	23%
3x Lab Assignments	

Acoustic Design Project 3x Homework Assignments	22%
Attendance:	10%
Total:	100%

Missing/Late Work
Specific expectations and assessment criteria will be included as part of each individual assignment in separate handouts. Missing or late work will be graded down at 10% of the final assessed grade per day. Work submitted later than 5 days will not be graded. If an assessment is missing or late due to an excused absence (see Shared Policies section of the syllabus), it needs to be completed in a timely manner. Specific submission deadlines will be coordinated by the module instructor.

Please note: Certain laboratory assignments or course experiences may not be able to be replicated and, if missed, will require specific arrangements to be coordinated with module Instructor. To pass the course, all modules must be completed at a passing level (60% or better) AS WELL AS the cumulative course grade.

UF Grading Policy
Information on UF's grading policy for assigning grade points can be found at the following location:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Grading Scale

Letter Grade:	Percentage Range:		Grade Points:
A	100 %	to 94.0%	4.0
A-	< 94.0 %	to 90.0%	3.67
B+	< 90.0 %	to 87.0%	3.33
B	< 87.0 %	to 84.0%	3.0
B-	< 84.0 %	to 80.0%	2.67
C+	< 80.0 %	to 77.0%	2.33
C	< 77.0 %	to 74.0%	2.0
C-	< 74.0 %	to 70.0%	1.67
D+	< 70.0 %	to 67.0%	1.33
D	< 67.0 %	to 64.0%	1.0
D-	< 64.0 %	to 61.0%	0.67
F	< 61.0 %	to 0.0%	0

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:
www.https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

Additional details regarding attendance and accommodations are as follows. Attendance for all labs and/or workshops is mandatory and is recorded. Chronic absences and/or tardiness will have a negative impact on your grade, with a loss of up to 15% over your overall score for three or more unexcused absences (see grade breakdown above). Attendance to lectures is expected and strongly encouraged, as materials covered in the lecture will be tested. If you must miss class (lecture or lab), it is your responsibility to notify the instructors in a timely manner, as well as getting the assignments and notes from your classmates.

SHARED POLICIES
The Office of Accreditation, Assessment, and Curriculum has created a go-link that should be included in the UF syllabi. This link will directs students to a separate webpage that will provide all required academic

policies, such as attendance, grading, DRC, and evaluation verbiage, as well as campus academic, health, and wellness resources. Please see below for the link: <https://syllabus.ufl.edu/syllabus-policy/>