

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

ARC 2491c. Integrated Building Technology I
SYLLABUS

GENERAL COURSE INFORMATION:

Total Credits: 3
Prerequisites: Completion of: ARC2490c Introduction to Building Technology
Class Meetings: Tues – [Lecture] CSE A101 periods 6-7 (12:50 PM - 2:45 PM)
Thurs – [Labs] ARC 216, 218, 220, periods 4-5 (10:40 AM - 12:35 PM) or
6-7 (12:50 PM - 2:45 PM)

Instructors: Digital Media Module: Weeks 1-5
Mani Karami
Office: Zoom, by email appointment
Contact: maniararch@ufl.edu
Office Hours: T, 10 AM - 12 PM

Environmental Design Module: Weeks 6-9
Martin Gold
Office: 260
Contact: Canvas Inbox or mgold@ufl.edu
Office Hours:

Materials and Methods Module: Weeks 11-15
Stephen Belton
Office: 239
Contact: Canvas Inbox or sbelton@ufl.edu
Office Hours: T10-12

GTAs: ARC 216 – Micah Fitzgerald – micahfitzgerald@ufl.edu, availability outside class TBA
ARC 218 – Sarah Spayd – sarahspayd@ufl.edu, availability outside class TBA
ARC 220 – Michael Nemery – michaelnemery@ufl.edu, availability outside class TBA

COURSE DESCRIPTION:

As the second course in a multi-year integrated building technology sequence, there will be an emphasis on further developing components of materials and methods and digital design through two, 5-week modules. Further, a third 5- week module will introduce fundamental aspects of environmental design, with the overarching intent to increase the students' understanding of the impact and/or relationships between context, building technologies, and design decisions.

COURSE RATIONALE AND PLACEMENT:

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.

COURSE METHODOLOGY:

This course will cover a range of topics and will be delivered in focused, topical modules.

Digital Media Module (weeks 1-5)

This module is a focused five-week segment designed to complement and enhance your studio work by developing your skills in architectural representation using both Lumion and Grasshopper. The first three weeks will cover the basics of 3D architectural visualization with Lumion, focusing on creating visualizations that communicate core

design ideas, spatial qualities, and conceptual depth. The final two weeks will introduce Grasshopper in Rhino, a parametric design tool that enables dynamic exploration of architectural forms and systems. Together, these tools bridge the gap between digital representation and design intent, guiding you to produce thoughtful and compelling representations of your projects.

Environmental Technology Module (weeks 6-9, week 10 is spring break)

Taught in conjunction with the Design 4 studio, Integrated Technology I provides a general introduction to climatology, and passive thermal response with particular emphasis on the context differing climates and locations. The topics of solar geometry, shading devices, and building orientation are covered. The topics of indoor air quality and natural ventilation, and the principles of heat flow and characteristics of thermal mass are introduced.

Materials and Methods Module (weeks 11-15)

This module continues the hands-on investigations with materials at a 1:1 scale and the implications of material decisions on design work. This module will offer an introduction to various material systems, with particular emphasis on mass-based systems, such as concrete and masonry, as well as an initial examination of lattice and/or frameworks.

Content Delivery: The modules will be composed of three different methods of content delivery.

- Lectures: Lectures will present the overarching content and issues to the class as a whole. These will be led by module instructors. Student attendance is expected.
- Labs: Lab sessions provide an opportunity to examine, discuss and understand content covered in each module in a more hands-on manner. Specific lab assignments will vary per module.
- Workshops: Workshops consist of brief intensive sessions to study specific topics within a module. Workshops will occur during lab sessions and may include group work, to better facilitate hands-on learning.

COURSE OBJECTIVES:

As the second course in a multi-course sequence, This course will build upon the skills and knowledge introduced in ARC 2490c Introduction to Building Technology, advancing the students understanding of fundamental aspects of building material systems and digital design tools, methodologies and means of representation. Further, this course will introduce the fundamental relationship of climate and context in the design process.

- Understand and advance fundamental aspects of building material systems
- Understand and advance the role and relationship of digital design tools to design projects
- Apply digital design methods to targeted design projects
- Understand the spatial and tectonic relationships of design in the digital realm
- Further Develop skills in digital representation methods and output
- Introduce the principles of context, solar orientation, heat gain and thermal comfort

COURSE TEXTS AND READINGS:

Materials and Methods Module:

Required Text:

[Fundamentals of Building Construction: Materials and Methods](#); Seventh Edition; Edward Allen and Joseph Iano; Wiley; 2019; ISBN 978-1-119-45025-2
(sixth edition is acceptable, if already purchased from previous semester)

Recommended Texts:

[Building Construction Illustrated](#), 6th Edition; Francis D. K. Ching; Wiley; 2019;
ISBN 978-1-119-58316-5 (fifth edition is acceptable, if already purchased from previous semester)

[The Architecture Reference & Specification Book](#), Julia McMorrough; Rockport; 2018 ISBN 9781631593796

Environmental Technology Module:

Required Text:

Environmental Technology for Architecture, Gold, Siebein, Siebein, Bensalem, Cognella Publishing; 2023. <https://store.cognella.com/>.

Recommended Texts:

[Heating, Cooling, Lighting: Sustainable Design Strategies Towards Net Zero Architecture](#), 5th Edition; Norbert M. Lechner, Patricia Andrasik, ISBN: 978-1-119-58574-9; Wiley; 2021

[The Green Studio Handbook: Environmental Strategies for Schematic Design](#); 3rd Edition; Alison G Kwok, Walter Grondzik; ISBN 9781138652293; Routledge; 2018

[Mechanical and Electrical Equipment for Buildings](#), 13th Edition; Grondzik & Kwok; Wiley; 2019; ISBN 978-1-119-49263-4 (Available online at [UF Library Systems](#))

American Building: The Environmental Forces That Shape It, by James Marston Fitch, William Bobenhausen, Oxford University Press; Revised and Updated edition; 1999

Digital Media Module:

Required Text: None; Computer Requirements: Lumion, Please refer to SoA Computing Requirements on Canvas

COURSE SCHEDULE & TOPICS (subject to shift):

	Week	Date	Readings	Class Topic
Digital Media Module	01 DIG	1/14+16	Refer to Schedule PDF	Rendering Fundamentals
	02 DIG	1/21+23	Refer to Schedule PDF	Lumion Part 1
	03 DIG	1/28, 30	Refer to Schedule PDF	Lumion Part 2
	04 DIG	2/04+06	Refer to Schedule PDF	Rhino Surface Modeling / GH Intro.
	05 DIG	2/11+13	Refer to Schedule PDF	Grasshopper

	Week	Date	Readings	Class Topic
Environmental Technology Module	06 ENV	2/18+20	Cognella module 1&2	Intro to ET + People and Their Senses
	07 ENV	2/25+27	Cognella module 3&4	Sun Climate Weather + Thermal Comfort
	08 ENV	3/04+06	Cognella module 5&6	Psychrometrics + Heat Flow
	09 ENV	3/11+13	Cognella module 7&8	Thermal properties Building Materials + Site planning Natural Systems
	10	3/17-21	Spring Break	
	11	3/27	ENV Exam	

	Week	Date	Readings	Class Topic
Materials/ Methods Module	11 MM	3/25+27	Allen/Iano Ch.1+13	Overview, Issues of Mass, Stereotomic Const.
	12 MM	4/01+03	Allen/Iano Ch.14+15	Concrete
	12 MM	4/02	D4 Design Reviews	
	13 MM	4/08+10		Concrete + Masonry
	14 MM	4/15+17	Allen/Iano Ch.8+9	Masonry
	15 MM	4/22		Masonry + Framework, Space, and Hierarchy
	16 MM	4/28		EXAM Honorlock/Canvas

COURSE EVALUATION/GRADING

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.

Digital Media Module (weeks 1-5):

By the end of this module, you will produce a final representation that balances rendering and linework, showcasing the layered complexity of your design. This representation will highlight key spatial moments and relationships, demonstrating your ability to use digital tools critically and creatively. Final representations will take the form of collages, balancing rendered elements (approximately 40%) with linework and other techniques (60%). The emphasis will be on storytelling through speculative renderings that represent the spatial, tectonic, and conceptual qualities of your design, avoiding static or overly polished visuals.

Environmental Technology Module (weeks 6-9):

Environmental Technology assignments will examine how fundamental relationships between of climate, context and design thinking/response through targeted assignments and/or workshops. These assignments include a small project through which the students design and build a mock-up of a shading device and assess its performance using heliodon method. This module will include a summary exam, in addition to assignments. This exam will include terminology, strategies for heat and indoor air quality, and other content covered during this module.

Material and Methods Module (weeks 11-15):

Assignments will expand the fundamentals of material systems and corresponding impacts to preliminary design and construction logics. Students will be expected to complete specific assignments and/or workshops. This module will include with a summary exam as part of the graded materials. This exam will include terminology, construction/material identification, and other content covered during this module.

Each module will be graded individually. The semester grade will be based on the following breakdown relative to content modules. **To pass the course, the cumulative course grade must be a 60% or better.**

Summary Breakdown for Course:

Attendance + Participation	10% of course grade
Materials/Methods Module:	30% of course grade
Environmental Tech Module:	30% of course grade
Digital Media Module:	30% of course grade
Total:	100%

Digital Media Module (weeks 1-5): 30% of course grade

Weekly Lab assignments/Homework – 14%
Module Project Weekly Updates – 6%
Module Project – 10%

Environmental Technology Module (weeks 6-9): 30% of course grade

Lab assignments
Psychrometry Lab Assignment
Thermal Comfort Lab Assignment
Solar Geometry Lab Assignment
Solar Shading Project

Materials/Methods Module (weeks 11-15): 30% of course grade

Lab assignments – 10%
Assignments/Precedent Analysis – 10%
Summary Exam – 10%

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 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 Attendance section of 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.

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	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
Numeric Grade	93-100	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	0-59
Quality Points	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	0.67	0.0

Note: grades will be rounded down to the nearest whole percentage.

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.catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

Additional details regarding attendance and accommodations are as follows. Attendance for all lectures, labs and/or workshops is mandatory and is recorded. Chronic absences and/or tardiness will have a negative impact on your grade. Tardiness of more than 20 minutes to any lab/lecture will be counted as an unexcused absence. Three or more unexcused absences may result in a full letter-grade reduction in the course. Four unexcused absences can result in failure of the course (see grade breakdown above). Materials covered in the lecture will be tested. If you must miss class, 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:

Course Evaluations:

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at gatorevals.ua.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 ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at gatorevals.ua.ufl.edu/public-results/.

Regarding accommodations for students with disabilities

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

Academic Honesty

Students in the School of Architecture are expected to adhere to all University of Florida academic honesty policies. Failure to do so will result in lowered grades and/or referral to the University Honor Court. Since the University's policies are necessarily generalized, the School of Architecture further clarifies academic honesty within the specific setting of design education. The following acts are considered to be academic dishonesty:

I. Plagiarism/misrepresentation

There shall be no question of what your work is and what someone else's is. This applies to all aspects of student

performance, including but not limited to

- CAD drawings and construction details
- design guidelines (written and graphic)
- design, planning, and management projects or portions of projects
- class reports and papers (again, both written and graphic information)
- any assignment where sole authorship is indicated, such as take-home tests, individual projects, etc.

Examples of inappropriate activities include:

- copying graphics for a report without crediting the original source
- representing someone else's work as your own (using existing CAD construction details, tracing drawings, etc.)
- allowing someone else to represent your work as his own

Given the collaborative nature of this course, interaction between students is desirable, but the intention and degree of assistance must be appropriate. For example, it is appropriate to discuss the assignment/method/software program/course materials—but it is not appropriate to solve or resolve a large portion of the project together, unless defined as such in the assignment.

The importance of precedent and learning from past works is a necessary part of most design processes. Again, it is the intent and degree of “borrowing” ideas that is at question.

Anything not original must be paraphrased and cited, or quoted; using accepted style formats such as APA, MLA, Chicago Manual of Style, etc. This includes information obtained from the Internet, public documents, graphics, and personal interviews as well as more traditional written sources. Proper crediting of all information that is not common knowledge is necessary for academic honesty as well as for professionalism. (For example, analysis drawings and/or text should cite the sources from which data was obtained so that if questions arise later, they can be quickly and accurately answered.)

2. Multiple submissions of the same or similar work without prior approval

This course is aligned with design studios with the intent of establishing concurrent lessons between both courses. In noting this, there will be moments when assignments and/or exercises for each class are expected to inform one another. In these instances, if course instructors understand and agree that you are doing an assignment associated with a specific topic, then doing similar work for two different classes is acceptable. It would be inappropriate to submit a single assignment for one class, then later submit the same assignment for another course if the instructors are expecting original work.

3. Falsifying information

Examples include:

- misrepresenting reasons why work cannot be done as requested
- changing or leaving out data, such as manipulating statistics for a research project, or ignoring/hiding inconvenient but vital site information. (However, for educational purposes only, certain aspects of the “real world” may be jointly agreed upon as not being pertinent to the academic goals of the course, such as not dealing with specific project parameters or budget, changing the program, etc.)
- altering work after it has been submitted
- hiding, destroying, or otherwise making materials unavailable (hiding reference materials, not sharing materials with other students, etc.)

Counseling + Emergency Contacts

Police / Fire / Medical Emergency – 911

U Matter, We Care, 294-2273; <http://www.umatter.ufl.edu>

Sexual Violence: 392-5648 or 392-1111 after hours, confidential reporting

University Counseling Center, 301 Peabody Hall, 392-1575; <https://counseling.ufl.edu>

University of Florida Student Health Care Center, 392-11671; <https://shcc.ufl.edu>

University of Florida Dean of Students, 392-1261, after hours: 392-1111 (ask for on-call staff); <https://dso.ufl.edu>

Alachua County Victim Services and Rape Crisis Center (24hrs/day); 264-6760

Alachua County Crisis Center (24 hrs/day), 264-6789