

ARC 4494C Integrated Building Technology 4

SYLLABUS

GENERAL COURSE INFORMATION:

Course times: T,Th | Period 6-7 (Lecture & Lab)
Total Credits: 3
Prerequisites: Completion of: 3493C IBT3
Class Room: ARCH 210 (Lecture + Lab)

Graduate Teaching Assistant: Dimitri Lonardo (dlonardo@ufl.edu)

Instructors:

Module 1: Weeks 1-5: Structures
Faculty: Jason Alread
Office: ARC 146
Contact: jalread@ufl.edu
Office Hours: TBD

Module 2: Weeks 6-10: Materials and Methods
Faculty: Jason Alread
Office: ARC 146
Contact: jalread@ufl.edu
Office Hours: TBD

Module 3: Weeks 11-15: Environmental Design
Faculty: Hassan Azad
Office: ARC 230
Contact: h.azad@ufl.edu
Office Hours: Tuesday 10:30AM – 12:30PM

COURSE DESCRIPTION:

The course will emphasize the development of structures, materials and methods, and environmental design skills that apply to large-scale building design. The course will give focus to both the technical knowledge of macro-scale design-drivers, as well as the detail implications of structure, 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 intended 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:

Structures (Module 1)

This module builds upon and advances an understanding of primary structural concepts from previous courses in the development of large-scale, high-rise, and long-span structural systems, while at the same time developing an understanding of the structural implications of details. The principles of lateral forces on design principles will be a central topic.

Materials and Methods (Module 2)

This module focuses upon both the implications of large-scale building programs with regards to codes and occupancies, as well as the integrated and multi-faceted understanding of façade assembly systems. The effects of zoning and building codes will be covered. Façade and curtain wall assemblies will be covered in detail in response to environmental and interactive criteria.

Environmental Design (Module 3)

This module addresses critical issues associated with large-scale building systems and their detail design implications. Computer simulations of acoustical and artificial lighting systems are introduced and exercised through design problems, as well as environmental responsive assessments of building systems, assemblies, and in particular envelope with regards to acoustics, artificial light, and energy use. The complementary module will build upon previous prerequisite course knowledge in the testing and refinement of building performance and façade assemblies with an intent to address the effects of environmental factors taught in the previous integrated building tech courses on a large-scale single project.

COURSE TEXTS AND READINGS:

Structures (Module 1):

Required Texts:

Designing Tall Buildings: Structure As Architecture. Second Edition. Sarkisian, Mark; Routledge; 2016; ISBN: 978-138-88671-1 (pbk), ISBN: 978-1-315-71463-9 (ebk). Note: This text should be available online through UF's agreement with Routledge (a subsidiary of Taylor and Francis).

Recommended Texts:

Structures: Sixth or Seventh Edition; Schodek, Daniel; Prentice Hall; 2000; ISBN-13: 9780130278210

Shaping Structures; Allen, Edward & Zalewski, Waclaw; J. Wiley and Sons; 1998; ISBN-13: 9780471289968

Materials and Methods (Module 2):

Recommended Texts:

Building Construction Illustrated, 6th Edition; Ching, Francis D. K. J. Wiley and Sons; December 2019; ISBN: 978-1-119-58316-5

Building Codes Illustrated: The Basics; Ching, Francis D. K. and Steven R. Winkel; September 2022; ISBN: 978-1-119-77252-1

Architectural Detailing: Function, Constructibility, Aesthetics: Third Edition; Allen, Edward, and Patrick Rand; J. Wiley and Sons; 2016; ISBN-13: 978-1118881996

Environmental Technologies (Module 3)

Recommended Texts:

*Mechanical and Electrical Equipment for Buildings; 13th Edition; Walter Grondzik and Alison Kwok; Wiley; 2019; ISBN 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 Olgay, McGraw Hill, 2001. (Available at UF Marston Science Library)

COURSE SCHEDULE:

Module 1	Week	Date	Readings	Class Topic	
Structural Systems	1	1/9	Eduard Sekler, <i>Structure, Construction, Tectonics (1965)</i>	Course Introductions (welcome back!)	
		1/11		No Lab meeting	
	2	1/16	Sarkisan: Ch. 2	Touching the Sky – the Evolution of the Skyscraper (or our collective fascination with tall things)	
		1/18		Structural Fundamentals	
				LAB: Introduction of <i>Case Studies Exercise</i>	
	3	1/23	Sarkisan: Ch. 3	Movement: Wind and Seismicity	
				LAB: Initial assessment	
		1/25		<i>Case Studies – the Influence of Wind</i>	
	4	1/30	Sarkisan: Ch. 5	The evolving language of tallness and slenderness	
		2/1		LAB: Consideration of Structure and Tectonics	
				<i>Case Studies – how tall, how thin</i>	
	5	2/6	Sarkisan: Ch. 12	NO CLASS - G2 Field Trip	
		2/8		Where are we now? / <i>Case Studies Review</i>	
	Module 2	Week	Date	Readings	Class Topic
Materials + Methods	6	2/13	TBA	Building Ideas.	
				LAB: Workshop: Fire + Egress	
		2/15		Constraints, Context, Climate, Codes, and Carbon	
	7	2/20	TBA	Building Systems: Scale, Measure, Dimension	
				LAB: Workshop: Planning the Tall Building	
		2/22		-	Enclosure Systems 1
	8	2/27	TBA	Shaping the sky: roofs, parapets, vegetated roofs, terraces, and roof decks	
				-	LAB: Thermal Envelopes & Energy Codes
		2/29		-	Enclosure Systems 2
	9	3/5	TBA	Vertical Infrastructure: Transportation and Conveyance Systems	
		3/7		TBA	LAB: Workshop: Whole to Part + Reflect and Look Ahead

	10	3/12	-	SPRING BREAK
		3/14		SPRING BREAK
Module 3 Environmental Technologies	Week	Date	Readings	Class Topic
	11	3/19	TBA	Review of acoustic fundamentals Reverberation time calculation
		3/21		LAB 1: RT Calculation
	12	3/26	TBA	Review of room acoustic parameters Acoustic measurement and simulation
		3/28		LAB 2: Ray Tracing (Image Source Method)
	13	4/2	TBA	Review of noise curves/standards Acoustic noise control
		4/4		LAB 3: Ray Tracing (Higher Orders)
	14	4/9	TBA	Lighting Measurement and Simulation
		4/11		LAB 4: DIALux Evo Workshop I
	15	4/16	TBA	Performance Assessments / Optimization (Lighting)
		4/18		No Lab meeting – Final Reviews
	16	4/23		LAB 5: DIALux Evo Workshop II
			READING WEEK	
	17	FINALS WEEK		FINAL EXAM

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 assignments will expand the fundamentals of structural systems and corresponding impacts to preliminary design and construction logics when considering more intense structural requirements. Students will be expected to complete specific lab assignments and contribute to a group case study project. Module 1 will include with a summary exam as part of the graded materials. This exam will be scheduled for week 5 and will include terminology, logics, and systems-based questions identification, and other content relative to Module 1.

Module 2 assignments will provide the opportunity to test student knowledge on small-scale quantitative examples and qualitatively to predict and critically assess integration of the topic within a focused design problem. These assignments will be instrumental in developing one final project, which assesses the synthesis and/or integration of course topics alongside a more refined design proposal.

Module 3 will examine how fundamental relationships are between environment, context and design thinking/response through targeted assignments and/or workshops. Module 3 assignments will include a comprehensive computer simulation project that models and analyzes acoustical and lighting systems of a building and its surrounding environment. It will also include 4 homework assignments. Module 3 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:

Structural Module:	33%
<i>Lab work and attendance</i>	30%
<i>Module 1 Exam (week 5)</i>	20%
<i>Case Study Analysis (group)</i>	50%
Materials Module:	34%
<i>Attendance + daily quizzes</i>	30%
<i>Lab work</i>	70%
Environmental Module:	33%
<i>Lab HW (5)</i>	65%
<i>Attendance</i>	10%
<i>Lighting Simulation Project</i>	25%
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 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 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

Score	Percent	Grade	Grade Points
940-1000	94-100	A	4.00
900-939	90-93.9	A-	3.67
870-899	87-89.9	B+	3.33
840-869	84-86.9	B	3.00
800-839	80-83.9	B-	2.67
770-799	77-79.9	C+	2.33
740-769	74-76.9	C	2.00
700-739	70-73.9	C-	1.67
670-699	67-69.9	D+	1.33
640-669	64-66.9	D	1.00
610-639	61-63.9	D-	0.67
0-609	0-60.9	E	0.00

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

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.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 ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at gatorevals.aa.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