

ARC 3493C Integrated Building Technology 3

SYLLABUS

GENERAL COURSE INFORMATION:

Course times: T, R | Period 4-5 (Lecture) and T, R | Period 7-8 or 9-10 (Lab)

Total Credits: 6

Prerequisites: Completion of: 3492C IBT2

Class Room: CAR 100 (Lecture)

ARCH 410 – Section 19102 (Lab - Period 7-8)

ARCH 412 – Section 19103 (Lab - Period 7-8)

ARCH 414 – Section 19104 (Lab - Period 7-8)

ARCH 418 – Section 19105 (Lab - Period 9-10)

ARCH 420 – Section 19106 (Lab - Period 9-10)

ARCH 422 – Section 19107 (Lab - Period 9-10)

Graduate Teaching Assistants: Sections 19102, 19105 – Isaac Brown (isaac.brown@ufl.edu)
Sections 19103, 19106 – Kyle Koehne (kylekoehne@ufl.edu)
Sections 19104, 19107 – Sidney Ruedas (sidneyruedas@ufl.edu)

Instructors: Module 1: Weeks 1-5: Structures
Faculty: Nawari Nawari
Office: ARC 254
Contact: nnawari@ufl.edu
Office Hours: T, R 1pm-2:00 pm or by appointment

Module 2: Weeks 6-10: Materials and Methods
Faculty: Yohan Kim
Office: ARC 244
Contact: yohan.kim@ufl.edu
Office Hours: F 3pm-5pm and by appt.

Module 3: Weeks 11-15: Environmental Design
Faculty: Hassan Azad
Office: ARC 230
Contact: h.azad@ufl.edu
Office Hours: W 3pm-5pm and by appt.

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 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:

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 emphasized.

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, 5th Edition; Ching, Francis D. K. J. Wiley and Sons; 2014; ISBN: 978-1-118-45834-1 (Available **online** at UF George A. Smathers Libraries)

Building Codes Illustrated: The Basics; Ching, Francis D. K. and Steven R. Winkel; September 2022; ISBN: 978-1-119-77252-1 (Available **online** at UF George A. Smathers Libraries)

Architectural Detailing: Function, Constructibility, Aesthetics: Third Edition; Allen, Edward, and Patrick Rand; J. Wiley and Sons; 2016; ISBN-13: 978-1118881996 (Available **online** at UF George A. Smathers Libraries)

Tall: The Design and Construction of High-Rise Architecture: 1st Edition; Marriage, Guy; Routledge; 2019; ISBN-13: 978-1-138-35076-2 (Available **online** at UF George A. Smathers Libraries)

Environnemental 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 Olgyay, McGraw Hill, 2001. (Available at UF Marston Science Library)

COURSE SCHEDULE:

	Week	Date	Readings	Class Topic
Module I Structural Systems	1	1/13		LECTURE: Course Introductions (welcome back!)
				LAB: Assignment 01
		1/15	Sekler, <i>Structure, Construction, Tectonics</i> (1965)	LECTURE: Touching the Sky
				LAB: Project assignment
	2	1/20	Sarkisan: Ch. 2	LECTURE: Fundamentals
				LAB: Assignment 02
		1/22	Sarkisan: Ch. 3	LECTURE: Touching the Ground
				LAB: Assignment 03
	3	1/27	Sarkisan: Ch. 3	LECTURE: Wind and Seismicity
				LAB: Assignment 04
		1/29	Sarkisan: Ch. 5	LECTURE: Lateral Resisting Systems
				LAB: Assignment 05
	4	2/3		LECTURE: STUDY!!! (no lecture)
				LAB: Structures Module Exam
		2/5		NYC trip
	5	2/10		NYC trip

		2/12		
				Structures Case Studies Due!

Module 2 Materials + Methods	Week	Date	Readings	Class Topic
	6	2/17	TBA	LECTURE: Building Ideas
				LAB : Assignment 01
		2/19	TBA	LECTURE: Constraints, Context, Climate, Codes, and Carbon
				LAB: Assignment 02
	7	2/24	TBA	LECTURE: Building systems & components: Introducing scale, dimension, and measure
				LAB: Assignment 03
		2/26	TBA	LECTURE: Enclosure Systems I
				LAB: Assignment 04
	8	3/3	TBA	LECTURE: Enclosure Systems 2
				LAB: Assignment 05
		3/5	TBA	LECTURE: Enclosure Systems 3
				LAB: Assignment 06
	9	3/10	TBA	LECTURE: Shaping the sky: roofs, skyspaces, skybridges, etc.
				LAB: Assignment 07
		3/12	TBA	LECTURE: Vertical Infrastructure: Transportation and Conveyance Systems
				LAB: Materials and Methods Module Exam

Spring Break	10	3/16 – 3/20		
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Module 3 Environmental Technologies	Week	Date	Readings	Class Topic
	11	3/24	MEEB Sections 22.1 - 22.5	History of Acoustics, Physics/Perception of Sound
		3/26		ET Lab 01: Acoustics in Literature
				Acoustic Materials, Ray Tracing
				ET Lab 02: Sound Intensity & dB
	12	3/31	MEEB Sections 23.1 - 23.10 Sections 22.6 - 22.18	Room Acoustics, Acoustic Parameters
		4/2		ET Lab 03: Reverberation Time
				Noise Criteria, Sound Isolation
				ET Lab 04: Ray Tracing
	13	4/7	MEEB Sections 23.11 - 23.36 Sections 25.1 - 25.9	Physics of Light
		4/9		ET Lab 05: DIALux I
				Light Perception
				ET Lab 06: DIALux II

	14	4/14	MEEB Sections 15.1- 15.37	Electric Light Sources, Light Distribution
		4/16	Sections 16.1- 16.8	ET Lab 07: DIALux III
	15	4/21	FINALS WEEK D6 Final Review on Monday 4/20	
		4/23	READING DAYS	NO CLASSES
	16	4/27 – 5/1	EXAMS WEEK	
		4/28	ET DIALux Project Due	
		4/30		

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 the lighting systems of a building and its surrounding environment through 3 lab assignments. It will also include 4 homework assignments to explore the acoustical systems. 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 the final project:

Structural Module:	30%
Classwork	15%
Lab assignments	20%
Exam	10%
Project	55%

Materials Module: 30%

Lab Assignments 60%

Project 20%

Exam 20%

Environmental Module: 30%

Acoustic Labs (4) 50%

Lighting Labs (4) 35%

ET Dialux Project 15%

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 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

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

Note: fractional percentages will be rounded down to nearest whole percentage number.

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 direct 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/uf-policy-on-course-syllabuses/>>