

Cover Sheet: Request 14553

ARC3XXX Integrated Building Technology 3

Info

Process	Course New Ugrad/Pro
Status	Pending at PV - University Curriculum Committee (UCC)
Submitter	Mark Mcglothlin mmcglath@ufl.edu
Created	12/15/2019 3:54:05 PM
Updated	1/13/2020 10:05:11 PM
Description of request	ARC3XXX Integrated Building Technology 3 is the fourth of a multiple course sequence. This course will replace two existing courses; ARC3463 Materials and Methods of Construction 2, and ARC3181 Advanced Digital Technologies.

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	DCP - Architecture 011502000	Mark Mcglothlin		12/15/2019
No document changes					
College	Approved	DCP - College of Design, Construction and Planning	Abdol Chini		12/19/2019
No document changes					
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			12/19/2019
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					
College Notified					
No document changes					

Course|New for request 14553

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Request: ARC3XXX Integrated Building Technology 3

Description of request: ARC3XXX Integrated Building Technology 3 is the fourth of a multiple course sequence. This course will replace two existing courses; ARC3463 Materials and Methods of Construction 2, and ARC3181 Advanced Digital Technologies.

Submitter: Mark Mcglothlin mmcglath@ufl.edu

Created: 1/14/2020 11:47:06 AM

Form version: 4

Responses

Recommended Prefix ARC

Course Level 3

Course Number XXX

Category of Instruction Intermediate

Lab Code C

Course Title Integrated Building Tech 3

Transcript Title Integrated Tech 3

Degree Type Baccalaureate

Delivery Method(s) On-Campus

Co-Listing No

Effective Term Earliest Available

Effective Year Earliest Available

Rotating Topic? No

Repeatable Credit? No

Amount of Credit 6

S/U Only? No

Contact Type Regularly Scheduled

Weekly Contact Hours 6

Course Description As the fourth course in a multi-year integrated building technology sequence, there will be an emphasis on further developing components of environmental design, materials and methods, and digital design skills that will allow students to apply their knowledge to mid-rise buildings of increasing complexity.

Prerequisites ARC3XXX Integrated Building Technology 2

Co-requisites ARC3321 Architecture Design 6

Rationale and Placement in Curriculum 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 Objectives This course will introduce students to the fundamental aspects and principles of structural systems in buildings, reinforce and advance the material and method systems that correspond to building structures, advance the understanding and relationships between design principles and environmental context, and examine more advanced digital design tools, methodologies and means of representation.

- Understand the fundamental aspects of building structural systems
- Examine the material relationship of building structure and tectonic and spatial systems
- Reinforce the relationship between design thinking and environmental factors
- Understand at an intermediate level the role and relationship of digital design tools to design projects
- Introduce the principles of parametric design operations and their application as a design

method to targeted design projects

Course Textbook(s) and/or Other Assigned Reading Digital (Module 1+3):

Required Text:

None

Environmental Design (Module 1-2):

Required Texts:

Heating Cooling Lighting: Sustainable Design Methods for Architects; Third Edition; Norbert Lechner; Wiley; 2008; ISBN 978-0470048092 (continued from ARC 3XXX, IBT2)

Mechanical and Electrical Equipment for Buildings; Twelfth Edition; Walter Grondzik and Alison Kwok; Wiley; 2014; ISBN 978-1118615904

Materials and Methods (Module 2-3)

Required Texts:

Building Codes Illustrated: Fifth Edition; Winkel, S. R. R., & Ching, Francis D.K.; J. Wiley and Sons; 2016; ISBN-13: 978-1119150923

Weekly Schedule of Topics Digital Media Module

Week 1 Grasshopper Intro

Week 2 GH: GIS Data Import, Data List Basics, Fabrication: 3D Printing Basics

Week 3 Shifting Lists, Strips, and Field Logics

Week 4 Volumetric Cell Subdivision Logics

Week 5 Kinetic Screen + Zaha Hadid; Bus Stop Project

Week 11

Real-Time Rendering: Lumion 10

Week 12

Real-Time Rendering: Lumion 10

Week 13

GH: Mesh Topologies, Weaverbird Fabrication: CNC Assemblies

Week 14

GH: Kangaroo Physics, Form-finding for Surface-Active Structures

Week 15

Firefly Physical Computing, Galapagos Evolutionary Solver and Optimization, CNC Fabrication Project

Environmental Technology Module

Week 1 Fundamentals, physics, and perception of sound

Week 2 Room acoustics: reflection, absorption

Week 3 Room acoustics: subjective - objective measures

Week 4 Building acoustics: Noise curves, TL and STC

Week 5 Building acoustics: MEP noise and IIC

Week 6

Perception and physics of light

Week 7

Electric light source and distribution

Week 8

Artificial light: calculation, simulation, design

Week 9

Energy principles, power grid

Week 10

Renewable energy: wind, PV, geothermal

Materials and Methods Module
Week 6

Plenum: Horizontal System Distribution
Week 7

Building Core: Vertical System Distribution
Week 8

Advanced Building Systems: Roof
Week 9

Advanced Building Systems: Walls
Week 10

Initial issues of Assembly and Detail
Week 11

Code Fundamentals: Health, Safety, Welfare
Week 12

Code: Construction Types
Week 13

Code: Fundamental Egress Methods
Week 14

Examining the Role of Detail
Week 15

Convention/Innovation/Invention

Grading Scheme Each module will be graded individually. The semester grade will be based on the following breakdown relative to content modules and final project. To pass the course, all modules must be completed at a passing level (60% or better) AS WELL AS the cumulative course grade.

Summary Breakdown for Course
Digital Media Module: 34%
Environmental Tech Module: 33%
Materials/Methods Module: 33%
Total: 100%

Digital Media Module (weeks 1-5 and 11-15): 34% of course grade

Grasshopper Data Import Assignment: 15% of module grade
3D Printing: 10% of module grade
Grasshopper Field/Subdivision Assignment: 10% of module grade
Bus stop Design Project (design/fabrication): 15% of module grade
Real-Time Rendering (Lumion): 10% of module grade
Grasshopper – Form-based Assignment: 10% of module grade
Physical Computing Assignment: 10% of module grade
Final Project: 20% of module grade

Environmental Technology Module (weeks 1-10) 33% of course grade:

Principles of Acoustics Assignment: 10% of module grade

Room Acoustics Measurement Assignment: 15% of module grade
Building Acoustics Workshop Assignment: 15% of module grade
Exam One: 10% of module grade
Perceptions of Light Assignment: 10% of module grade
Energy/Power Systems Assignment: 10% of module grade
Luminaire Design Competition: 15% of module grade
Exam Two: 15% of module grade

Materials and Methods Module (weeks 6-15) 33%:

Building System Distribution Assignment: 10% of module grade
Roof to Wall Assemblies Assignment: 10% of module grade
Roof to Wall Assemblies Assignment: 10% of module grade
Assembly to Detail Assignment: 10% of module grade
Exam One: 10% of module grade
Code Search Assignment: 15% of module grade
Egress Assignment: 10% of module grade
Reading Assemblies and Details Assignment: 10% of module grade
Exam Two: 15% of module grade

Instructor(s) Digital Media Module: to be determined
Environmental Technology Module: to be determined
Materials/Methods Module: to be determined

Attendance & Make-up Yes

Accommodations Yes

UF Grading Policies for assigning Grade Points Yes

Course Evaluation Policy Yes

ARC 3XXX . Integrated Building Technology 3
SYLLABUS

GENERAL COURSE INFORMATION:

Course times: TBD

Total Credits:

6

Prerequisites:

Completion of: ARC3XXX Integrated Building Technology 2

Class Room:

TBD

Instructors:

Digital Media Module (weeks 1-5 and 11-15):

Faculty Member 1

Office: XX

Contact: XX

Office Hours: XX

Environmental Technology Module (weeks 1-10):

Faculty Member 2

Office: XX

Contact: XX

Office Hours: XX

Materials/Methods Module (weeks 6-15):

Faculty Member 3

Office: XX

Contact: XX

Office Hours: XX

COURSE DESCRIPTION:

As the fourth course in a multi-year integrated building technology sequence, there will be an emphasis on further developing components of environmental design, materials and methods, and digital design skills that will allow students to apply their knowledge to mid-rise buildings of increasing complexity.

COURSE RATIONALE AND PLACEMENT:

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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 OBJECTIVES:

This course will build upon the skills and knowledge of ARC3XXX Integrated Building Technology 3. Students will examine the topics of lighting, power and acoustics as part the building environmental systems. The materials and methods topics will environmental systems integration and distribution, mechanical movement systems, and a focused study of building code constraints, regulations, calculations, and interpretations. Students will be studying advanced digital media systems, with focus on advanced digital geometries, synchronous data systems, real-time rendering, and digital fabrication methodologies.

- Understand the role and relationship of artificial lighting systems and logics within buildings
- Understand power distribution methods and systems integration within buildings
- Understand the role, relationship and use of building codes as an integral part of design thinking
- Understand at an advanced level the role and relationship of digital design tools to design projects
- Introduce the principles of advanced digital output, both in real-time animation and digital fabrication techniques.

NAAB Student Performance Criteria

Primary Location for Student Performance Criteria

- B.4
Technical Documentation
- B.6
Environmental Systems
- B.7
Building Envelope Systems and Assemblies
- B.8
Materials and Assemblies
- B.9
Building Service Systems

Secondary Location for Student Performance Criteria

- None

Digital Media Module (weeks 1-5 and 11-15)

Taught in conjunction with the Design 6 studio, these two modules build upon previous Digital Technology coursework and introduces intermediate to advanced topics in parametric design, 2D and 3D digital fabrication basics such as laser cutting, CNC machining, and 3D printing. Current trends in architectural visualization using real-time rendering programs and animations are covered, in addition to advanced topics in digital simulation, form-finding, and optimization. The modules culminate in two semester projects that combine and integrate the design and fabrication methods covered.

Environmental Technology Module (weeks 1-10)

Taught in conjunction with the Design 6 studio, this course builds on the previous environmental technology coursework, with an emphasis on acoustical systems: room acoustics and building acoustics. The formal, spatial and material aspects of acoustic design in conjunction with architectural design are introduced. Artificial light systems are discussed, and their design criteria and calculation and simulation methods are practiced. Finally, Energy systems and power grid distribution are introduced followed by the introduction of renewable energy systems including wind farms, PV systems, geothermal and solar hot water systems.

Materials and Methods Module (weeks 6-15)

This module focuses on the overall system integration and enclosure. This will include an initial examination of the integration of building codes with regards to construction types, occupancies, and egress fundamentals. The modules will also study the spatial implications of building mechanical systems and the potentials for advanced/green systems of enclosure.

COURSE TEXTS AND READINGS:

Digital Media Module (weeks 1-5 and 11-15):

Required Text:

None

Environmental Technology Module (weeks 1-10):

Required Texts:

Heating Cooling Lighting: Sustainable Design Methods for Architects; Third Edition; Norbert Lechner; Wiley; 2008; ISBN 978-0470048092 (continued from ARC 3XXX, IBT2)

Materials and Methods Module (weeks 6-15)2-3)

Required Texts:

Building Codes Illustrated: Fifth Edition; Winkel, S. R. R., & Ching, Francis D.K.; J. Wiley and Sons; 2016; ISBN-13: 978-1119150923

COURSE SCHEDULE:

	Week	Date	Readings	Clas
Digital Media + Materials/ Methods	11 DIG	XX	XX	Real
	11 MM		XX	Cod
	12 DIG	XX	XX	Real
	12 MM		XX	Cod
	13 DIG	XX	XX	GH: Fabr
	13 MM		XX	Cod
	14 DIG	XX	XX	GH: Forr
	14 MM		XX	Exar
	15 DIG	XX	XX	Fire and CNC
	15 MM		XX	Con
	16	READING WEEK		NO
	17	FINALS WEEK		FIN.

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 which will correspond with module topics, and synchronous assignments that complement concurrent, studio-based design projects.

Digital Media Module (weeks 1-5 and 11-15):

Digital Media assignments will expand the fundamentals of parametric design methodologies, advanced representational methodologies, advanced 3D rendering solutions, as well as CNC digital fabrication, and the corresponding relationships that are brought to preliminary design and construction logics. Students will be expected to complete specific assignments and/or workshops. This module will include two targeted assignments; a small parametric design/fabrication (week 5) and a final project (week 15). This project will cover the synthesis of materials, joinery, design, fabrication, and other content relative to the Digital Media module.

Environmental Technology Module (weeks 1-10):

Environmental Technology assignments will expand the fundamentals of environmental systems methodologies and corresponding impacts to preliminary design and construction logics. Students will be expected to complete specific assignments and/or workshops. Assignments will also include a small acoustical analysis project (week 1-5) and a luminaire design competition (week 6-10). This module will include two exams as part of the graded materials, scheduled for weeks 5 and 10 during lecture periods. These exams will include terminology, acoustical systems, artificial lighting systems, energy and power systems and other content relative to this module.

Materials/Methods Module (weeks 6-15):

Assignments will focus on the concerns of Materials and Methods of Construction, both in concept and in visual documentation. The Materials/Methods topics will also include incremental assignments and a larger, summary code assessment. This module will include two exams, scheduled for weeks 10 and 15. These exams will address building codes, issues of enclose, system/material identification within building details, and other content relative to this module.

Each module will be graded individually. The semester grade will be based on the following breakdown relative to content modules and final project. **To pass the course, all modules must be completed at a passing level (60% or better) AS WELL AS the cumulative course grade.**

Summary Breakdown for Course

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Grasshopper Field/Subdivision Assignment – 10% of module grade

Bus stop Design Project (design/fabrication) – 15% of module grade

- *Real-Time Rendering (Lumion) – 10% of module grade*

Grasshopper – Form-based Assignment – 10% of module grade

Physical Computing Assignment – 10% of module grade

Final Project – 20% of module grade

Environmental Technology Module (weeks 1-10) 33% of course grade:

Principles of Acoustics Assignment – 10% of module grade

Room Acoustics Measurement Assignment – 15% of module grade

Building Acoustics Workshop Assignment – 15% of module grade

Exam One – 10% of module grade

Perceptions of Light Assignment – 10% of module grade

Energy/Power Systems Assignment – 10% of module grade

Luminaire Design Competition – 15% of module grade

Exam Two – 15% of module grade

Materials and Methods Module (weeks 6-15) 33%:

Building System Distribution Assignment – 10% of module grade

Roof to Wall Assemblies Assignment – 10% of module grade

Roof to Wall Assemblies Assignment – 10% of module grade

Assembly to Detail Assignment – 10% of module grade

Exam One – 10% of module grade

- *Code Search Assignment – 15% of module grade*

Egress Assignment – 10% of module grade

Reading Assemblies and Details Assignment – 10% of module grade

Exam Two – 15% of module grade

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-
Numeric Grade	93-100	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62
Quality	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	0.67

Points	7.0	5.0	3.0	3.0	2.0	2.0	2.0	1.0	1.0	1.0	0.0
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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/](https://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.afl.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.afl.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:

1. 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.

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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

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