



M.E. Rinker, Sr. School of Construction Management BCN 4905 – Studies in Construction Information Systems Syllabus

Course Details

BCN 4905 – Studies in Construction Information Systems

Credits: 3
Semester: Spring 2025
Lecture Time: Wednesdays 1:55 pm to 4:55 pm (Periods 7-9)
Room: RNK 106

Contact Information

Course Instructor: Dr. R. Raymond Issa
Office: RNK 325
E-mail: raymond-issa@ufl.edu
Office Hours: By appointment

Lab Instructor: Chady Elias/Ricardo Gallopp/Isabelle Southern
Office: RNK 338 (Center for Advanced Construction Information Modeling)
E-mail: chadyelias@ufl.edu
Office Hours: By appointment

Course Expectations

Students are not expected to have any prior knowledge of the topics covered in this class.

Course Description

This course will explore the core principles and practices of Building Information Modeling (BIM) and Virtual Design and Construction (VDC). Students will also be introduced to Digital Twins (DTs) and advanced construction technologies. Additionally, the course will cover Machine Learning (ML) and its various applications.

Course Method

This course will employ both traditional and flipped classroom methods. Students are expected to complete any assigned work before the next class session (i.e., Wednesday). Each Wednesday, time will be allocated for questions, quizzes, and presentations. Additionally, students should engage in independent learning using the resources provided. The aim of this course is to enhance students' understanding of how cloud-connected tools, collaboration platforms, and advanced construction technologies can transform and improve the construction management process, ultimately supporting project and operational success. Instructional materials for this course consist of only those materials specifically reviewed, selected, and assigned by the instructor(s). The instructor(s) is only responsible for these instructional materials.

Course Objectives

In this course, students will gain an understanding of how advanced construction technologies can enhance performance and productivity in construction management. They will also develop a foundational knowledge of the facilities management, as well as implementing advanced analytics that can be utilized to streamline operations.



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1. Master both basic and advanced modeling techniques in Revit.
2. Explore effective practices for implementing cloud-based BIM collaboration tools in construction.
3. Learn how to steer models between platforms to conform to interoperability standards.
4. Transform BIMs into DTs, creating dynamic, up-to-date models that reflect the current state of the building.
5. Gain a foundational understanding of Machine Learning and apply it to real-world scenarios.
6. Collaborate on a research-based project with other students.

Course Resources

1. All resources required for the class will be provided by the instructor on Canvas.
2. There are several well-produced series of tutorials online which students are highly encouraged to view and work with to further supplement course material.

Required Software

All the following software are installed in the computer labs. You are also required to install the software on your personal computers. Other software might be added during the semester.

1. Autodesk Software available through the Autodesk Education Community
<http://www.autodesk.com/education/home>
 - a. Create a free account, using your ufl.edu account, and download the following software,
 - i. Revit 2024
 - ii. Navisworks Manage 2024
2. Autodesk Tandem and Autodesk Construction Cloud Platform
 - a. Access to the online platforms will be provided by the instructor at the start of the semester and will be removed following the end of the semester.
3. CMBuilder
 - a. Cloud-based platform, access will be provided by the instructor. <https://www.cmbuilder.io/>
4. Programming and Game Engines
 - a. Visual Studio Code
 - b. Twinmotion (Epic Games)



Grading Criteria

Assignments

During the first half of the semester, the class is a series of workshops in which students are given several problem statements they are expected to solve using advanced construction technologies. Depending on the topic, the workshop can span over just one week or more. Students are expected to submit their assignments by the due date. **Failure to comply will result in 10 % of the assignment grade deducted for every day the assignment is late.** You can only submit up to three days late.

Quizzes

Some lectures do not have associated assignments. Instead, students will sit for small quizzes that ensure they watched all the lectures and read the provided resources.

Project

During the second half of the semester, students will be grouped in teams and supervised by doctoral students from the Rinker School. Each group will tackle a different project and present their findings at the end of the semester.

Grade Distribution

The grade of the class is computed based on the following table,

Description	Percentage of Final Grade
Assignments	45%
Quizzes	24%
Project	25%
Attendance	6%
Total	100%

This course is a graded course. Passing this class is based upon your participation in all workshops and your critical thinking ability to come up with solutions to the problems at stake. The letter grades will be computed according to the following scale:

A	93-100	C	73-76.9
A-	90-92.9	C-	70-72.9
B+	87-89.9	D+	67-69.9
B	83-86.9	D	63-66.9
B-	80-82.9	D-	60-62.9
C+	77-79.9	E	<60

Honors Policy

You are expected to follow the University Honors Policy when working on assignments, homework, projects, and exams. Please read and agree to this statement.

"I understand that the University of Florida expects its students to be honest in all of their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action, up to and including expulsion from the University."



Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

UF Policies

University Policy on Accommodating Students with Disabilities: Students requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive. Therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

University Policy on Academic Misconduct: Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at <http://www.dso.ufl.edu/students.php>.

Getting Help

For issues with technical difficulties for E-learning in Canvas, please contact the UF Help Desk at:

- Learning-support@ufl.edu
- (352) 392-HELP - select option 2
- <https://lss.at.ufl.edu/help.shtml>

Other resources are available at <http://www.distance.ufl.edu/getting-help> for:

- Counseling and Wellness resources
- Disability resources
- Resources for handling student concerns and complaints
- Library Help Desk support



Week	Date	Course Topic	Assignment Due
MODULE 1: BUILDING INFORMATION MODELING			
1	1/15	<p>Course Overview:</p> <ul style="list-style-type: none"> Syllabus and schedule review Overview of the required software <p>Revit Overview:</p> <ul style="list-style-type: none"> Revit Basics Architectural Modeling: Placing and editing walls 	
2	1/22	<p>Architectural Modeling in Revit:</p> <ul style="list-style-type: none"> Placing and editing floors, shaft openings, and ceilings 	Assignment 1a: Architectural Model
3	1/29	<p>Architectural Modeling in Revit:</p> <ul style="list-style-type: none"> Placing and editing windows, doors, roofs, stairs, and ramps 	Assignment 1b: Architectural Model
4	2/5	<p>MEP Modeling in Revit:</p> <ul style="list-style-type: none"> MEP overview <p>Reality Capture</p> <ul style="list-style-type: none"> Walkthrough (Twinmotion) 	Assignment 1c: Architectural Model
MODULE 2: SIMULATION AND REALITY CAPTURE			
5	2/12	<p>Reality Capture</p> <ul style="list-style-type: none"> Overview of current technologies 4D Simulation (CMBUILDER) <p>Project Initiation</p>	Assignment 2: Walkthrough
MODULE 3-4: Digital Twins and Machine Learning			
6	2/19	<p>Digital Twins</p> <ul style="list-style-type: none"> Definition, maturity levels Digital Twins and Facilities Management Autodesk Tandem 	Assignment 3: 4D Simulation
7	2/26	<p>Machine Learning</p> <ul style="list-style-type: none"> Introduction, definition, key concepts and tools <p>Assignment 4 Q&A</p>	
8	3/5	<p>Digital Twins</p> <ul style="list-style-type: none"> Tandem Connect APIs <p>Machine Learning</p> <ul style="list-style-type: none"> Basic Application 	Assignment 4: Status Twin



9	3/12	Digital Twins <ul style="list-style-type: none"> • FM Data Integration • ML Integration Machine Learning <ul style="list-style-type: none"> • Batch Learning • Online Learning 	Assignment 5: ML
MODULE 5: PREDICTIVE TWINS - PROJECT			
10	3/26	Project – Predictive Digital Twins <ul style="list-style-type: none"> • Project Framework • Discussions 	
11,12	4/2, 4/9	Project <ul style="list-style-type: none"> • Milestone tracking • Q&A 	
13, 14	4/16, 4/23	Final Presentation <ul style="list-style-type: none"> • Class reflections • Project presentation 	Project

***This syllabus represents our current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunities. Such changes, communicated clearly, are not unusual and should be expected.*