BCN 5905 Special Studies in Construction: Construction Technology

Class: Tuesday Periods 10-E1 (5:10 PM - 8:10 PM)

Room: RNK 106

Final Exam: 12/11/2025 @ 5:30 PM - 7:30 PM

Instructors:

Dr. Chaofeng Wang, **email:** chaofeng.wang@ufl.edu

Dr. Ian Flood, **email:** flood@ufl.edu

Office Hours: Posted on Canvas

Description: This is a non-traditional special studies course. We will have sessions together where we hold lectures, discussion sessions, and tutorials. However, a lot of the information and instruction will be in the form of directed self-study and directed research assignments.

Part 1, 3D Concrete Printing in Construction: The student will be able to understand the fundamental principles of additive manufacturing technologies applied to construction. Analyze the benefits and limitations of additive construction methods compared to traditional construction techniques. Design basic structures for 3D printing in construction.

Part 2, Machine Learning in Construction: The understanding and application of empirically based artificial intelligence techniques (specifically machine learning and artificial neural networks – ML/ANN) to the field of construction science, technology and management.

Textbook: No textbook is required. All course materials will be available through the Canvas website.

Course Modules:

Part 1, Module 1: Introduction to Additive Construction
Part 1, Module 2: Additive Manufacturing Processes
Part 1, Module 3: Design for Additive Manufacturing
Part 1, Module 4: Structural Integrity and Building Codes
Part 1, Module 5: Materials for Additive Construction

Part 2, Module 6: Introduction to Machine Learning in Construction
Part 2, Module 7: Developing Machine Learning Models: *Designing, Training, and Testing*
Part 2, Module 8: Summary of Machine Learning Methods and their Applications

Grading System:

PART 1: 3D Concrete Printing in Construction		
Assignment 1	Structural and Material Optimization	10
Assignment 2	Design Principles and Practice	10
Group Project	Lab Printing, Testing	15
Exam 1	3DCP Exam. Mid Semester	15
SUB-TOTAL for Part 1, 3DCP		**50%**
PART 2: Machine Learning in Construction		**Grade**
Assignment 3	Linear Regression as an Introduction to the Machine Learning Development Strategy: *Building energy consumption case study*	10
Assignment 4	Artificial Neural Networks: *The building energy consumption case study revisited using PyTorch*	10
Group Project	**Part I:** Development and Analysis of a Machine Learning Solution: A Case Study from Construction and its Related Fields *(Data Collection, Analysis and Formatting)*	10
	Part II: Development and Analysis of a Machine Learning Solution: A Case Study from Construction and its Related Fields, using PyTorch *(Model Development, Verification and Validation)*	10
Exam 2	Machine Learning Exam. Final	10
SUB-TOTAL for Part 1, Machine Learning		**50%**
COURSE TOTAL		**100%**

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

Attendance and Make-ups: Attendance to this course is mandatory and will graded as part of participation. Requirements for class attendance, make-up exams, assignments, and other work in this course are consistent with university policies that can be found at <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>. Late assignments may not be accepted at the discretion of the instructor.

Class Demeanor: Students are expected to log in to class 5 minutes prior to the start time. Students must behave in a manner that is respectful to the instructor and to fellow students. Please mute yourself all times, unless asking a question, to avoid unnecessary interruptions. Opinions held by other students should be respected in discussion, and conversations that do not contribute to the discussion should be held at minimum, if at all. Rude and disrespectful behavior will not be tolerated, and the instructor holds the right to kick out someone from the virtual meeting if deemed acting inappropriate. Conduct that is deemed to be in violation with University rules and regulations or the Code of Student Conduct will result in a report to the Director of Student Conduct and Conflict Resolution for a conduct code infraction.

Accommodations: Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. 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.

Online 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 https://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 https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/."

Honor Code: All students in this course are subject to the requirements of the University of Florida's Honor Code <https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>. Cheating will not be tolerated. Although joint work on assignments may be acceptable in some cases, duplication of an assignment either manually or electronically will be dealt with as an act of academic dishonesty. "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."

Reservations and Remedies: The instructor reserves the right to modify the course schedule and modules as deemed fit. If any questions, issues, or concerns about the course (assessment, policies, schedule, etc.), please contact the instructor to remedy any issue.

Accessing University Academic Policies and Campus Resources To support consistent and accessible communication of university-wide student resources, please use this link to academic policies and campus resources: https://go.ufl.edu/syllabuspolicies.