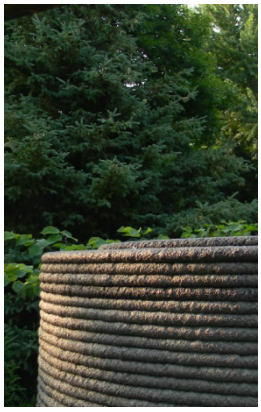
COLLEGE OF DESIGN, CONSTRUCTION AND PLANNING UNIVERSITY OF FLORIDA

Building Research - Additive Construction Technologies

COURSE NUMBER: BCN6933

TERM: Spring 2024
NUMBER OF CREDIT HOURS: 3
CLASS LOCATION: Rinker Hall 0215
CLASS MEETING TIMES:
W | Period 7 (1:55 PM - 2:45 PM)
M | Period 7 - 8 (1:55 PM - 3:50 PM)
INSTRUCTOR: Dr. Chaofeng Wang
OFFICE HOURS: M 3:50 PM - 5:50 PM



COURSE DESCRIPTION

Additive Construction Technologies is an advanced course focusing on the principles and applications of additive manufacturing processes in the construction industry. The course will cover the latest innovations in 3D printing of building materials and components, exploring their potential to revolutionize construction methods, increase efficiency, and reduce environmental impact. Students will learn about various materials suitable for additive construction, the design process for additive manufacturing, and the challenges and opportunities associated with implementing these technologies in real-world construction projects.

COURSE OBJECTIVES

By the end of this course, students 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 using CAD software for 3D printing in construction. Evaluate the environmental impact and sustainability of materials used in additive construction. Apply knowledge of additive construction technologies to propose innovative solutions to current industry challenges.

COURSE EVALUATION

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

GRADING POLICIES:

Assignment	Points
Assignments	70
Final Project	30
Total	**100**

GRADING SCALE

Divide the total points you earn by **the total possible points**. Grades will be given according to the following scale.
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 grade will be computed in proportion to the number of presences on the days the rolls were taken and participation grade is based on responding to a given discussion topic in the class forum.

- At the end of each module an individual assignment will be given that covers topics that were discussed in that module. Specific evaluation criteria will be provided with each assignment.

- A final group project will be assigned that requires implementing existing AI algorithms in a project in the built environment, to facilitate planning, design and construction strategies.

COURSE SCHEDULE:

Module	**Topic**	**Class Content**
Module 1	Introduction to Additive Construction	Overview of Additive Manufacturing History and Evolution of 3D Printing in Construction
Module 2	Additive Manufacturing Processes	Detailed Study of Additive Techniques: Extrusion, Sintering, Binding, etc. Case Studies: Analysis of Current Additive Construction Projects
Module 3	Design for Additive Manufacturing	Principles of DfAM Software Tools and Modelling Techniques
Module 4	Structural Integrity and Building Codes	Ensuring Structural Integrity in Additive Construction Compliance with International Building Codes and Standards
Module 5	Cost Analysis and Economic Impact	Cost-Benefit Analysis of Additive vs. Traditional Construction Market Trends and Economic Potential
Module 6	Environmental Impact and Sustainability	Life Cycle Assessment of Additive Construction Projects Strategies for Minimizing Environmental Footprint
Module 7	Materials for Additive Construction	Properties of Building Materials for 3D Printing Sourcing and Sustainability of Additive Construction Materials
Module 8	Guest Lectures	Presentations by Industry Experts on Advanced Additive Construction Techniques Q&A Sessions with Leaders in Additive Construction Research
Module 9	Lab	Hands-on Experience with 3D Printing Equipment Mini-Projects to Apply Additive Construction Techniques
Module 10	Final Project	Development of Individual or Group Projects Progress Reviews and Feedback Sessions

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