CEE 8813 Syllabus

Construction Equipment and Methods | CEE 8813 | 3 Credits

Spring 2027

Instructor Information

Instructor: Dr. Yong K. Cho

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General Course Information

Description

This heavy/highway construction course introduces construction equipment and methods used in heavy civil projects. It is designed for CEE students interested in design or construction. Topics include equipment unit costs, productivity, cycle times, computer simulation to optimize the use of construction resources (such as workers and equipment) for productivity improvement, and AI- and IoT-based worker productivity monitoring to support workforce workflow design.

Course Learning Outcomes

Upon successful completion of this course, students should be able to:

- Identify the types and functions of equipment commonly used in heavy civil construction.
- Estimate construction equipment unit costs, productivity, and operation cycle times.
- Evaluate the use of workers and equipment in construction operations based on cost, productivity, and cycle-time considerations.
- Develop computer simulation models to optimize the use of workers and equipment and improve construction productivity.
- Use AI- and IoT-based worker productivity monitoring information to evaluate and design more effective workforce workflows.

Course Materials

The following textbooks are optional:

- Construction Methods and Management, 8th ed., S. W. Nunnally, Pearson Prentice Hall, ISBN 0-13-500079-3.
- Construction Equipment Management, 2nd ed., John E. Schaufelberger and Giovanni C. Migliaccio, Routledge, 2019.

Prerequisite: None

Grading Policy

A: 90.00–100%; B: 80.00–89.99%; C: 70.00–79.99%; D: 60.00–69.99%; F: 59.99% or below.

Assignments

- Participation: 10%
- Quizzes and homework combined: 20%
- One exam: 30%
- IoT-based workforce workflow design group project: 20%
- Computer simulation group project: 20%

Description of Graded Components

Homework is assigned throughout the semester and submitted through Canvas by the stated deadline, before class unless otherwise specified. Each student submits their own work unless the assignment is designated as group homework.

Quizzes and the exam cover lecture slides, notes, handouts, homework, videos, guest lectures, and/or projects. Unless otherwise stated, they are closed-book and closed-notes. The exam may be reviewed but not returned. Students should bring only permitted materials and their student ID.

Two term group projects are required. The IoT-based workforce workflow design project uses AI- and IoT-based productivity monitoring information to analyze construction workers' activities and develop an improved workforce workflow design. The computer simulation project develops a simulation of construction operations to optimize the use of assets, including workers and equipment, for productivity improvement. Both projects use the same evaluation criteria: relevance of the problem (10%), quality and accuracy of the analysis or model and proposed design (30%), presentation & report (30%), teamwork (20%), and meeting deadlines (10%). Project instructions, deliverables, and dates will be provided through Canvas.

Course Policies

Attendance and/or Participation

Class attendance is mandatory. Students are expected to attend regularly, arrive on time, and participate. One unexcused absence is waived without penalty. For each additional unexcused absence, 2 points will be deducted from the 10-point participation component, up to a maximum deduction of 10 points. Students remain responsible for coursework missed during absences. Institute-approved excused absences will be accommodated. Using cell phones, tablets, or computers for personal web searches, email, texting, or other coursework during class is inappropriate and may negatively affect the participation grade.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to

obtain an accommodations letter. Please also email the instructor as soon as possible to arrange a discussion of your learning needs.

Student-Faculty Expectations Agreement

Georgia Tech emphasizes the importance of maintaining an atmosphere of mutual respect, acknowledgment, and responsibility between faculty members and students. The Student-Faculty Expectations Agreement outlines shared expectations and responsibilities. Respect for knowledge, hard work, and cordial interactions helps create a productive learning environment. Faculty and students are expected to uphold these principles.

Collaboration, Group Work, and Use of Generative AI

Students may discuss homework with classmates, but they must identify collaborators on the submitted cover sheet and submit their own work. For designated group assignments, one submission per group is permitted. Quizzes and exams must be completed individually.

Generative AI tools may be used to study concepts, brainstorm approaches, and check understanding. Students must independently complete and verify submitted answers. For both term group projects, any use of generative AI must be disclosed, including the tool used and how it was used. Generative AI must not be used to produce the final workflow design, final simulation design, or final project solutions. Submitting AI-generated work as one's own is not permitted. Generative AI is not permitted on quizzes or the exam unless explicitly authorized.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

Late homework is graded for learning purposes but receives no credit. Missed quizzes or the exam receive a zero except in university-excused circumstances. The exam will not be rescheduled for personal travel or conflicts with other exams except where required by Georgia Tech policies. Students with documented personal emergencies may contact the Office of the Dean of Students for assistance.