

Graduate Tracks

CONSTRUCTION ENGINEERING & MANAGEMENT

Nearly all civil engineering projects require the management skills of a construction engineer. The scheduling and erection of constructed facilities is the responsibility of construction engineers. Construction engineers analyze constructed facilities based on function, economics, and safety; they determine the construction schedule, safe erection methods and equipment used, and they estimate the total labor and material costs of the constructed facility. Proper procedures used by engineers during construction will increase performance and productivity and reduce the risk of construction failure and deficiencies.

Students pursuing a graduate degree in construction are encouraged to get a broad background in both engineering and management. Depending on the students' interests, additional courses may be found in other departments: cognitive-related courses from the Integrated Systems Engineering Department, history of technology courses from the Architecture and History Departments, and artificial-intelligence and other intelligent systems from the Computer Science and Engineering Department. In addition, courses are available in several other departments, such as Statistics and Mathematics.

Research

The areas of research activities of faculty and graduate students include safety of construction operations; safety of structures and infrastructures; system safety and reliability; development of improved methods for predicting time, cost, and cash flow; risk and decision analysis of construction processes; worker's training and safety; computer-based planning and scheduling of construction projects; and construction estimating and bidding. Recent studies include learning from the past, such as historical constructions, ancient construction operations and construction materials. Understanding historical construction is the key to future green and sustainable constructions. Several tools like the fault tree analysis, fuzzy logic, intelligent systems, multi-media and visualization, and virtual reality, have been used to conduct research in the above areas. Research activities of the program include: use of 3D models and virtual reality techniques to simulate ancient and future construction activities; and development of intelligent systems to diagnose construction accidents and safety.

Facilities

The University computer facility is the Ohio Supercomputer Center located on campus. This facility principally supports research computing. The University also provides a variety of computer resources on campus. In addition, the department has specialized computational facilities. The facilities are under the auspices of the College of Engineering Region 1, which is supported, in part, by a University computer fee. The physical facility consists of three rooms with over 135 PCs and multiple printers. Students have 24-hour, 7-days-a-week keycard access. Some are available on a walk-in basis; others provide studio settings for advanced users. At least 50 software packages are available, including the Microsoft Office suite, AutoCAD, and various GIS and image processing packages. The University also provides an environment that gives students access to a variety of computer resources on campus, in Ohio, and on the Internet.

Faculty

Fabian C. Tan, Professor, Dr. Eng., P.E., University of California, Berkeley (construction safety, construction simulation, and historical construction); E-mail: tan.184@osu.edu

Interdisciplinary Programs

The construction management program strongly supports and encourages interdisciplinary collaboration. The faculty and members of other departments cooperate to develop sets of courses that prepare graduate students to deal with interdisciplinary problems. Architecture, Agriculture, Integrated Systems, Humanities and Computer Science and Engineering are some examples of potential partners. Generally, the need for an interdisciplinary problem arises when a student chooses to work on a thesis that involves other areas.

Funding

Funding is available to support graduate education through Graduate Research Assistantships (GRAs), Graduate Teaching Assistantships (GTAs), University and Department Fellowships and other sources. Prospective students are encouraged to contact faculty in their area of interest to inquire about funding opportunities.

Course Offerings

TABLE A	Title	Credits
CIVILEN 8810*	Construction Intelligent System and Simulation I	3
CIVILEN 8820*	Construction Intelligent System and Simulation II	3
ISE 5700	Introduction to Cognitive Systems Engineering	3
ISE 5760	Cognitive Engineering Systems: Visualization and Human-Computer Interfaces	3
ISE 5870	Resilience Engineering	2
ISE 5820	Systems Thinking in Engineering and Design	3
TABLE B		
ARCH 5110	History of Architecture I	4
ARCH 5120	History of Architecture II	4
CIVILEN 5001	Introduction to Geographic Information Systems	4
CIVILEN 5130	Applied Hydrology	3
CIVILEN 5168	Introduction to the Finite Element Method	3
CIVILEN 5310	Matrix Structural Analysis	3
CIVILEN 5370	Prestressed Concrete Design	3
CIVILEN 5410	Engineering Survey	3
CIVILEN 5441	Introduction to GPS: Theory and Applications	3
CIVILEN 5561	Principles of Soil and Rock Mechanics	3
CIVILEN 5571	Principles of Foundation Analysis and Design	3
CIVILEN 5810	Construction Safety and Forensics	3
CIVILEN 5820	Construction Estimating	3
CIVILEN 5830	Construction Scheduling	3
CIVILEN 5840	Construction Contracts and Claims	3
CIVILEN 5850	Construction Student Seminar	2
CSE 5521	Survey of Artificial Intelligence I: Basic Techniques	2
CSE 5522	Survey of Artificial Intelligence II: Advanced Techniques	3
CSE 5526	Introduction to Neural Networks	3
CSE 5531	Introduction to Cognitive Science	3

CSE 5539	Intermediate Studies in Artificial Intelligence	2
CSE 5545	Advanced Computer Graphics	3
CSE 5559	Intermediate Studies in Computer Graphics	2
CSE 5913	Capstone Design: Computer Animation	4
HISTORY 5700	Special Topics in the History of Environment, Technology & Science	3
HISTORY 7705	Graduate Readings in the History of Technology	1 - 6
HISTORY 7710	Graduate Readings in the History of Science	1 - 6
MATH (MS only)		
MATH 5051	Introduction to Mathematical Logic	3
MATH 5168	Introduction to the Finite Element Method	3
MATH 5603	Numerical Linear Algebra	3
STAT 5510	Statistical Foundations of Survey Research	3
STAT 5740	Introduction to SAS Software	2
STAT 6201	Mathematical Statistics	4
STAT 6301	Probability for Statistical Inference	3
STAT 6302	Theory of Statistical Analysis	3
STAT 6410	Design and Analysis of Experiments	4
STAT 6450	Applied Regression Analysis	4
STAT 6520	Applied Statistical Analysis with Missing Data	3

*Must be taken for MS and PhD in construction, unless approved otherwise by the advisor.

Graduate Applications: To be considered for admission, you must first apply to the University. Applications are available at <http://gpadmissions.osu.edu/apply/grad.html>. For additional information, contact Mary Leist, leist.48@osu.edu, 614/292-2005.