
CEE 616 – 851 Construction Cost Estimation

(3 credits)

Lectures Monday(s)
 Online

Instructor Instructor Name: Giri Venkiteela, PhD Office Hours: By email appointments
 Instructor E-Mail: venkitee@njit.edu
 Instruction office Location: Zoom

Prerequisite CE 610-Construction Management

Required Textbook

Estimating In Building Construction, Ninth Edition, Frank R. Dagostino and Steven J. Peterson
Published By: Prentice Hall 978-0134701165

Other Recommended Texts & Reading

None

Course Description *(from NJIT's course catalog)*

Full range of construction cost-estimating methods including final bid estimates for domestic building and heavy/highway projects; computerized takeoff and estimating techniques; international construction; financial and cost reporting; databases; indices; risk; competition; performance; and profit factors.

Course Objectives (General)

By the end of this course, the student will be able to:

1. Demonstrate the estimating and quantity take-off process and how they are associated with construction cost control.
2. Identify the differences between various contracting systems in the construction bidding process.
3. Identify and extract the actual costs associated with construction materials from databases and trade publications.
4. Apply current tools and technologies in construction cost estimation.
5. Create a construction business plan proposal using cost estimation for the stakeholder.
6. Communicate effectively about construction cost estimation, contracts and ethics in estimating through weekly discussion posts, conversations and bidding projects.
7. Review scholarly articles and publications within the domain of construction cost estimation, evaluating their content, methodologies, and conclusions.

POLICIES & PROCEDURES

Academic Integrity: It is expected that NJIT’s University Code on Academic Integrity will be followed in all matters related to this course. Refer to NJIT’s Dean of Students website to become familiar with the Code on Academic Integrity and how to avoid Code violations.

<https://www.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>

Communication: Email communication is preferred

Lectures/Class: Participation in online discussion is a must.

Handouts: Handouts will be made available online thru Canvas.

Homework: Individual assignments and they will be assigned weekly

Homework Format: Please follow the instructions provided during lectures to complete homework.

Late Homework: Late homework will not be accepted and graded

Homework Solutions: Homework solutions are made available upon request.

Exams: Midterm exam and Research paper.

Calculation of Course Grade: A weighted average grade will be calculated as follows:

Midterm	30%
Discussion Forums	15%
Assignments/Quizzes	20%
Bidding Project/Project Check-ins	30%
Knowledge Checks/Reflections	5%

The minimum requirements for final letter grades are as follows:

A = 90-100%, B+ = 85-89%, B = 80-84%, C+ = 75-79%, C = 70-74%, D = 65-70%, F < 65.0%

Final grades are curved based on the highest points acquired in the class.

Instructor Commitment: You can expect the instructor to be courteous, punctual, organized, and prepared for lecture and other class activities; to answer questions clearly; to be available during office hours or to notify you beforehand if office hours are moved; to provide a suitable guest lecturer or pre-recorded lecture when they are traveling or unavailable; and to grade uniformly and consistently.

AI statement: Student use of artificial intelligence (AI) is permitted in this course for certain assignments and activities. It is permitted to be used in the following assignments, as doing so would undermine student learning and achievement of course learning outcomes. Additionally, if and when students use AI in this course, the AI must be cited as is shown within [NJIT Library AI Citation page](#) for AI. If you have any questions or concerns about AI technology use in this class, please reach out to your instructor prior to submitting any assignments.

Assignments that can be performed using AI: Module 11 and 12 assignments. Please use your own understanding when replying peer discussions. AI is allowed certain parts of the bidding project including outline and general introduction sections.

Students with Documented Disabilities: NJIT is committed to providing students with documented disabilities equal access to programs and activities. If you have, or believe that you may have, a physical, medical, psychological, or learning disability that may require accommodations, please contact the Coordinator of Student Disability Services located in the Center for Counseling and Psychological Services, in Campbell Hall, Room 205, (973) 596-3414. Further information on disability services related to the self-identification, documentation and accommodation processes can be found on the webpage at: (<http://www.njit.edu/counseling/services/disabilities.php>)

Course Schedule:

Week	Topic	Reading/Assignment	Due Dates
1	Introduction to Estimating and Contract Documents	Read: Chap 1 Discussion-Peer Introductions	Initial Post-Thurs Peer Reply-Sun
2	Contracts, Bonds, Insurance, Project Manuals, Labor, Equipment, Overhead and Contingencies	Read: Chap 2, Chap 3, Chap 6, Chap 7 and Chap 8 Discussion-Renting vs. Buying Equipment Module 2 Assignment	Initial Post-Thursday Peer Reply-Sunday Sunday
3	Profit, Estimate, Quantity Takeoff	Read: Chap 4, Chap 5 and Chap 21 Knowledge Check Discussion-Finding a Subcontractor Module 3 Assignment Reflection	Sunday Initial Post-Thursday Peer Reply-Sunday Sunday Sunday
4	Excavation	Read: Chap 10 Discussion-Excavation Module 4 Assignment	Initial Post-Thursday Peer Reply-Sunday Sunday
5	Masonry, Metal and Wood	Read: Chap 12, Chap 13 and Chap 14 Discussion-Masonry Module 5 Assignment	Initial Post-Thursday Peer Reply-Sunday Sunday
6		Read: Chap 11 and Review for midterm	

Week	Topic	Reading/Assignment	Due Dates
	Concrete Estimating	Discussion-Estimating Concrete Quantities Reflection	Initial Post-Thursday Peer Reply-Sunday Sunday
7	Midterm Exam	Discussion-Midterm- related Questions Midterm Exam	Sunday
8	Bidding Project Assignment	Discussion-Sharing Bidding Experience Bidding Project Assigned	Initial Post-Thursday Peer Reply-Sunday
9	Thermal and Moisture Protection, Doors and Windows, Finishes	Read: Chap 15, Chap 16 and Chap 17 Discussion-New Construction vs. Renovation Article Review Reflection	Initial Post-Thursday Peer Reply-Sunday Sunday Sunday
10	Mechanical Insulation Estimating	Read: Chap 19 and Chap 20 Discussion-Geographical Influence Article Review Project Check-in #1	Initial Post-Thursday Peer Reply-Sunday Sunday Sunday
11	Anatomy of a Construction Project	Discussion-Business Plan vs. Sustainability Practices Module 11 Assignment	Initial Post-Thursday Peer Reply-Sunday Sunday
12	Value Engineering	Read: Value Engineering Theory Discussion-Value Engineering in Construction Quiz Project Check-in #2	Initial Post-Thursday Peer Reply-Sunday Sunday Sunday
13	Bidding Project Focus	Discussion-Bidding Project-related Questions	Sunday

Week	Topic	Reading/Assignment	Due Dates
		Reflection	
14	Final Project Revisions	Review for Final Exam Discussion-Bidding Project Reflections Final Project Revisions	Initial Post-Thurs Peer Reply-Sun
15	Bidding Project Submission	Submit Bidding Project	TBD-To be announced the first week of the semester

Course Objectives Matrix - 616 – 851

Strategies and Actions	Course Student Learning Outcomes	Student Outcomes (1-7)	Program Educational Objectives	Assessment Methods/Metrics
Course Objective 1:				
Demonstrate the estimating and quantity take-off process	Understand the quantity takeoff process	1,2,3	Engineering Practice	HW, Class discussion and Midterm exam
Course Objective 2:				
Identify the differences between various contracting systems in the construction bidding process.	Understanding of the contracting systems in the construction industry	1,2,3,4	Engineering Practice	HW, Class discussion and Midterm exam
Course Objective 3:				
Identify and extract the actual costs associated with construction materials from databases and trade publications	Knowledge of cost principles associated with construction materials	1,2,3,4	Engineering Practice	HW, Class discussion and Midterm exam
Course Objective 4:				
Apply current tools and technologies in construction cost estimation.	Familiarity with latest tools in quantity takeoff process	5,6 7	Engineering Practice and Professional Growth	Research paper and presentation
Course Objective 5:				
Create a construction business plan proposal using cost estimation for the stakeholder.	Writing cost proposal based on knowledge gained in the course	5,6 7	Engineering Practice and Professional Growth	Research paper and presentation

Course Objective 6:				
Communicate effectively about construction cost estimation, contracts and ethics in estimating through weekly discussion posts, conversations and bidding projects.	Writing a technical report	5,6 7	Engineering Practice and Professional Growth	Research paper and presentation
Course Objective 7:				
Review scholarly articles and publications within the domain of construction cost estimation, evaluating their content, methodologies, and conclusions	Understanding and summarizing research papers based on technical journal format	5,6 7	Engineering Practice and Professional Growth	Research paper and presentation

CEE Mission, Program Educational Objectives and Student Outcomes

The mission of the Department of Civil and Environmental Engineering is:

- to educate a diverse student body to be employed in the engineering profession
- to encourage research and scholarships among our faculty and students
- to promote service to the engineering profession and society

Program Educational Objectives

Our **Program Educational Objectives** are reflected in the achievements of our recent alumni:

1. **Engineering Practice:** Alumni will successfully engage in the ethical practice of civil engineering within industry, government, and private practice, working towards safe, practical, resilient and sustainable solutions in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.
2. **Professional Growth:** Alumni will advance their technical and interpersonal skills through professional growth and development activities such as graduate study in engineering, research and development, professional registration and continuing education; some graduates will transition into other professional fields such as academia, business, and law through further education.

3. **Service:** Alumni will perform service to society and the engineering profession through membership and participation in professional societies, government, educational institutions, civic organizations, charitable giving and other humanitarian endeavors.

Student Outcomes

Our **Student Outcomes** are what students are expected to know and be able to do by the time of their graduation:

1. an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative environment, establish goals, plan tasks and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusion
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

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