

**NEW YORK CITY COLLEGE OF TECHNOLOGY of
the City University of New York**

The Department of Construction Management and **Civil
Engineering Technology**

CMCE 2315 Elements of Structural Design - Steel

Course Description:

This course provides a working knowledge of the basic concepts encountered in the analysis and design of structural steel elements. The American Institute of Steel Construction (AISC) specifications for the design, fabrication and erection of structural steel for buildings are studied, particularly as they apply to the design of beams, columns and connections. Analysis methods and procedures are developed for solving practical problems encountered in civil engineering. Students will learn to use the charts, tables, design aids and specifications available for simple structural design which are contained in the "AISC Steel Handbook." Student projects include the use of desktop computers.

Prerequisites: CMCE 1215 with a grade of C or higher

3 Class hours, 3 credits

Textbook: Structural Steel Design, McCormac and Csernak, 6th edition, Pearson 2017.
AISC Manual of Steel Construction, 15th edition.

Program Criteria:

ABET, Inc. is the nationally recognized accrediting body for engineering technology programs. The CMCE department has adopted the most current ABET Program Criteria. Graduates of baccalaureate degree programs typically specify project methods and materials, perform cost estimates and analyses, and manage construction activities. The CMCE curriculum provides instruction in the following areas:

- Estimation of costs, estimation of quantities, and evaluation of materials for construction projects (Criterion b);
- Apply fundamental computational methods and elementary analytical techniques in sub-disciplines related to construction engineering; (Criterion d);
- Production and utilization of documents related to design, construction, and operations (Criterion e);
- Performance of economic analyses and cost estimates related to design, construction, and maintenance of systems associated with construction engineering; (Criterion f);
- Selection of appropriate construction materials and practices (Criterion g);
- Performance of standard analysis and design in at least one sub-discipline related to construction engineering (Criterion i).

Course Learning Outcomes:

The CMCE department has adopted the most current ABET student outcomes criteria. Student performance in this course will be assessed based on the following learned capabilities:

- an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline (Criterion 1);
- an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline (Criterion 2);
- an ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature (Criterion 3);
- an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes (Criterion 4);

Student Evaluations:

Assignments	3 assignments x 5 points = 15 points	15%
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Exams:	3 exams x 20 points each = 60 points	60%
Final Exam:	1 exam x 25 points = 25 points	25%

Final Grade = 100%

Academic Integrity Policy:

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity.

Accordingly, **academic dishonesty is prohibited** in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, or expulsion.

Coordinator: Prof. Navid Allahverdi, (Last Updated: October 26, 2020)

Course Outline:

Class Schedule	Topic	Reading Assignment	Assignments & Practice Problems
Lecture 1	Introduction and Review	Chapter 1	
Lecture 2	Introduction and Review		
Lecture 3	Beam Flexure	Chapter 4	4-2, 4-3, 4-4
Lecture 4	Beam Analysis		4-8 to 4-10, 4-12
Lecture 5	Beam Design		4-18, 4-24, 4-27 Assign. 1
Lecture 6	Shear and Deflection		4-38, 4-39, 4-48
Lecture 7	Bolt Holes in Beams		4-50, 4-51
Review			
Exam 1			
Lecture 8	Transverse Shear	Chapter 2	2-3a (Trans. only), 2-7
Lecture 9	Block Shear		2-3a, 2-11
Lecture 10	Transverse/Block Shear		Assign. 2
Lecture 11	Bolt Shear and Bearing	Chapter 7	
Lecture 12	Bolt Shear and Bearing		7-5, 7-6
Lecture 13	Framed Connections		7-16, 7-18
Review			
Exam 2			
Lecture 14	Welded Connections	Chapter 8	8-2, 8-4
Lecture 15	Design of Welds		8-7, 8-8
Lecture 16	Column Analysis / Design	Chapter 3	Assign. 3
Lecture 17	Column Analysis / Design		3-31, 3-32
Lecture 18	Base Plate Design		3-28a, 3-28c
Review			
Exam 3			
Lecture 19	Beam -Columns	Chapter 6	
Lecture 20	Beam -Columns		6-1, 6-4
Lecture 21	LRFD: Structural Members	Chapter 13	
Review			
Final Exam			