

Summer 2019

CE 432-002: Structural Steel Design

Ahmed Ibrahim

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JOHN A. REIF, JR. DEPARTMENT OF
**CIVIL AND ENVIRONMENTAL
 ENGINEERING**



**CE 432 - Structural Steel Design
 Section 002**

Summer 2019

Text: Segui, William, Steel Design, 6th Edition, Cengage Learning ISBN: 978-1337094740 and AISC Steel Construction Manual - 15th Edition. Students can purchase the manual directly from AISC with discount code from CEE Department Prof. Wecharatana

Instructor: Dr. Ahmed Ibrahim, Room XXX, 917-518-3346, XXXX@njit.edu;
 Office Hours: TBD

***Prerequisite:** A working knowledge of structural analysis including determinate and indeterminate beams and frames is essential. The development of current design procedures for structural steel elements and their use in multistory buildings, bridges, and industrial buildings.*

Lecture	Date(MM/DD/YYYY)	Topics	Pages	Problems (To be assigned in class)
1	05/21/2019	Introduction to Steel Design, Concepts, Specifications and Applied Loads	Chapter 1,2 Page 1-40	To be assigned in class
2	05/23/2019	Tension Members	Chapter 3 Page 41-108	
3,4	05/28/2019 05/30/2019	Compression Members	Chapter 4 Page 109-188	
5	06/04/2019	Review & Qui (2 hrs.)	Closed Book	
6	06/06/2019	Introduction to Beams	Chapter 5 Page 189-298	
7,8	06/11/2019 06/13/2019	Beam Design and Analysis		
9,10	06/18/2019 06/20/2019	Beam Columns	Chapter 6 Page 299-376	
11	06/25/2019	Review & Quiz(2 hrs.)	Closed Book	
12	06/27/2019	Simple Connections	Chapter 7 Page 377-476	
13	07/02/2019	Eccentric Connections	Chapter 8 Page 477-592	
14	07/04/2019	Plate Girders	Chapter 10 Page 665-717	
15	07/11/2019	Final Exams (2.5) hrs.)	Closed Book	

GRADING:

Homework and Attendance	20%
Quizzes	40%
Final Exam	40%
Total	100%

*The NJIT Honor Code will be upheld and any violations will be brought to the immediate attention of the Dean of Students.

*Students will be consulted with by the instructor to any modifications or deviations from the syllabus throughout the course of the semester.

CE 432 - Structural Steel Design**Description:**

Design of tension members, beams, columns, beam columns, connections and plate girders.

Prerequisites: CE 332-Structural Analysis
CE 260 – Civil Engineering Methods

Textbook (s) Materials Required:

Segui, Williams, Steel Design, 5th Edition, Cengage Learning ISBN: 13-978-1-111-57600-4 and AISC Steel Construction Manual – 15th Edition Students can purchase the manual directly from AISC with discount code from Prof. Wecharatana.

2. AISC Steel Construction Manual, AISC, 15th Edition

Course Objectives:

1. Illustrate and develop methodologies, and introduce and employ the concept of codes and specifications for design of structural steel members and elementary structures.
2. Apply and enhance the knowledge of strength of materials and structural analysis.
3. Incorporate proper use of modern engineering tools for problem solving and communication.

Topics:

Introduction

Analysis and Design of Tension Members

Compression Members

Beam-Columns

Connections

Plate Girders

Schedule: Lecture/Recitation – 3 hour class, once per week

Laboratory – none

Professional Component: Engineering Topics (Design)

Program Objectives Addressed: 1,2

Prepared By: Prof. Methi Wecharatana

Course Objectives Matrix – CE 432 Structural Steel Design

Strategies, Actions and Assignments	ABET Student Outcomes (1-7)	Program Educational Objectives	Assessment Measures
Student Learning Outcome 1: Apply design methodologies and concept of codes and specifications for design of structural steel members and elementary structures.			
Illustrate load and resistance factor design LRFD and allowable stress design (ASD) philosophies. Formulate the LRFD methodology.	1, 2	1, 2	Homework, projects, quizzes, and exams.
Discuss AISC Construction Manual Load & Resistance Factor Design (LRFD).		1	
Student Learning Outcome 2: Apply and enhance the knowledge of strength of materials and structural analysis.	1, 2	1	Homework, quizzes, and final exam.
Incorporate and apply basic knowledge of strength of materials and structural analysis.			
Student Learning Outcome 3: Use modern engineering tools for problem solving and communication.	1, 2	1	Homework, quizzes, and final exam.
Introduce state of the art analysis and design software (STAAD/Pro), and code.			
Discuss the pitfalls with “black box” use of computers and interpretation of computer output.	7	1, 2	Homework and projects that are solved using STAAD/Pro, and AISC Manual
	7	1, 2	Certain homework and projects are solved both manually and by STAAD/Pro, and AISC Manual

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 scholarship among our faculty and students
- to promote service to the engineering profession and society

Our program educational objectives are reflected in the achievements of our recent alumni:

1 – Engineering Practice: Alumni will successfully engage in the practice of civil engineering within industry, government, and private practice, working toward 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 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 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.

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 and inclusive 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 conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Revised: 04/23/19