BOĞAZİÇİ UNIVERSITY

Department of Civil Engineering

Syllabus of CE356 Steel Structures

COURSE	*Credits*	(2+0+2) 3
	Lecture Hours	TT 67, ThTh 67
	Lecture Hall	M2181, M2230
INSTRUCTOR	*Name*	Serdar SELAMET
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COURSE TEXTBOOK

- W.T. Segui, "Steel Design", Cengage Learning, 5th Edition (ISBN-10: 1111576009)

OTHER SUPPLEMENTAL MATERIALS

- C.G. Salmon, J.E. Johnson, F.A. Malhas, "Steel Structures: Design and Behavior", 5th Edition (ISBN-10: 0131885561)
- AISC Steel Construction Manual (14th Edition)
- Eurocode 3 - Design of Steel Structures
- ASCE 7-10 – Minimum Design Loads for Buildings and Other Structures

COURSE DESCRIPTION (CATALOG)

Design of steel structures, building codes, material properties of steel, Load and Resistance Factor Design (LRFD), tension members, compression members, beams and beam-columns, column buckling, lateral-torsional buckling.

PREREQUISITE

CE246

LABORATORY AND COMPUTER USAGE

Students are encouraged to use software for structural analysis as part of the design problems.

CE356 Steel Structures

GRADING POLICIES

2 Midterms 40%, Final Exam 35%, Homework and Attendance 20%, Class Participation 5%

Requirements to take the Final Exam:

50% class attendance & minimum one midterm should be taken

- Attendance policy - Students are expected to attend all the lectures and laboratory sessions. They are also expected to perform all the work assigned by the instructor and the TA.
- Tardy policy - All the assigned work must be submitted by the due date and time. Submissions that are within the next two days will be penalized for 50% of the grade. After 2 days, submissions will neither be accepted nor graded. Exceptions can be made for students with emergencies or special circumstances.
- Make-up policy - Students are expected to take the exams on the assigned dates and times. Make-up exams may be arranged for students with emergencies or special circumstances. The instructor should be notified at least 24 hours before the exam date. If not, no make-up exam is made.

CURRICULAR CONTEXT

Throughout the course, basic principles and practical aspects for the design of structural steel members and systems are given, and design problems are solved primarily based on AISC codes. Estimated design content is 75 %.

COURSE OUTCOMES

(1) Learn the structural steel design principles of AISC building code.

(2) Introduce the tension, compression, shear, torsion and flexural strength capacity equations and derive the stability equations of steel members.

(3) Introduce to the limit states of steel connections. Review steel structural design examples from practice.

STUDENT OUTCOMES

This course is intended to contribute to the following program outcomes:

(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

CE356 Steel Structures

Week	Topics	Reading / Assignment	Objectives
1	Introduction to Steel Structures / Steel Material	Chapter 1 & 2	Review of historical development of structural steel usage in bridges and buildings. Steel material properties, advantages and disadvantages of steel material as applied to structures. Load and Resistance Factor Design (LRFD). Loadings and load combinations.
2	Tension Members	Chapter 3	Tensile strength of steel. Limit states in tension. Design examples.
3	Bolts Welds	Chapter 7 HW1	Types of structural bolts and welds. Patterns of failure modes of bolted and welded connections.
4	Compression Members: Columns	Chapter 4	Design of columns. Euler buckling. Local buckling (plate buckling) LRFD buckling curves. Effective length concept.
5	Compression Members: Columns (cont'd)	Chapter 4 HW2	Design of columns. Euler buckling. Local buckling (plate buckling) LRFD buckling curves. Effective length concept.
6	Beams: Laterally Supported	Chapter 5	Bending strength. Bi-axial bending. Shear strength. Deflection. Beam design.
7	**MIDTERM I** Beams: Laterally Supported (cont'd)	Chapter 5 HW3	Bending strength. Bi-axial bending. Shear strength. Deflection. Beam design.
8	Torsion	Lecture Notes, Referenced Books	Torsional strength. Torsional buckling.
9	Beams: Laterally Not Supported	Lecture Notes, Referenced Books	Lateral-torsional buckling of beams. Local buckling. Design curves.
10	Beam-Columns	Chapter 6 HW4	Axial load-moment interaction curve. 2nd Order Effects, Braced and unbraced members.
11	Connections	Chapter 8	Shear connections, Moment connections.
12	**MIDTERM II** Connections	Chapter 8	Shear connections, Moment connections.
13	Composite Steel-Concrete Construction	Chapter 9 HW5	Neutral axis in composite structures. Effective flange width. Shear connectors. Continuous beams.
14	Seismic Design	Lecture Notes, Referenced Books	Laterally resistive design, Bracings.