BOĞAZİÇİ UNIVERSITY

Department of Civil Engineering

Syllabus of CE353 Steel Structures

COURSE	*Credits*	(2+0+2) 3
	Lecture Hours	MM 67, FF 34
	Lecture Hall	M2230, NH404
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 or CE351

LABORATORY AND COMPUTER USAGE

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

GRADING POLICIES

2 Midterms 50%, Final Exam 40%, 5% Homework, 5% Attendance

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.

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, 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:

- ✓ (c) An ability to design a system, component, or process to meet desired needs
- ✓ (e) An ability to identify, formulate and solve engineering problems
- (i) A recognition of the need for, and ability to encage in life-long learning
- ✓ (k) An ability to use the techniques, skills and modern engineering tools necessary for engineering practice

Week	Topics	Reading / Assignment	Objectives
1 **Sep 22 - Sep 26**	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 **Sep 29 - Oct 3**	Tension Members	Chapter 3	Tensile strength of steel. Limit states in tension. Design examples.
3 **Oct 10**	Bolts Welds	Chapter 7	Types of structural bolts and welds. Patterns of failure modes of bolted and welded connections.
4 **Oct 13 - Oct 17**	Compression Members: Columns	Chapter 4	Design of columns. Euler buckling. Local buckling (plate buckling) LRFD buckling curves. Effective length concept.
5 **Oct 20 - Oct 24**	Compression Members: Columns (cont'd)	Chapter 4	Design of columns. Euler buckling. Local buckling (plate buckling) LRFD buckling curves. Effective length concept.
6 **Oct 27 - Oct 31**	Beams: Laterally Supported	Chapter 5	Bending strength. Bi-axial bending. Shear strength. Deflection. Beam design.
7 **Nov 3 - Nov 7**	Beams: Laterally Supported (cont'd)	Chapter 5	Bending strength. Bi-axial bending. Shear strength. Deflection. Beam design.
8 **Nov 10 - Nov 14**	Torsion	Lecture Notes, Referenced Books	Torsional strength. Torsional buckling.
9 **Nov 17 - Nov 21**	Beams: Laterally Not Supported	Lecture Notes, Referenced Books	Lateral-torsional buckling of beams. Local buckling. Design curves.
10 **Nov 24 - Nov 28**	Beam-Columns	Chapter 6	Axial load-moment interaction curve. 2nd Order Effects, Braced and unbraced members.
11 **Dec 1 - Dec 5**	Beam-Columns (cont'd)	Chapter 6	Axial load-moment interaction curve. 2nd Order Effects, Braced and unbraced members.
12 **Dec 8 - Dec 12**	Connections	Chapter 8	Shear connections, Moment connections.
13 **Dec 15 - Dec 19**	Composite Steel-Concrete Construction	Chapter 9	Neutral axis in composite structures. Effective flange width. Shear connectors. Continuous beams.
14 **Dec 22**	Structural Steel Applications from Practice	Lecture Notes, Referenced Books	Major aspects of successful designs of tall steel buildings, examples of failed structures.