

<b>Faculty</b>	<b>Faculty of Engineering</b>		
<b>Program</b>	<b>B.Sc. in Civil Engineering</b>	<b>Elective</b>	
	<b>B.Sc. in Computer Engineering</b>	<b>Elective</b>	
	<b>B.Sc. in Electrical-Electronics Engineering</b>	<b>Elective</b>	
	<b>B.Sc. in Industrial Engineering</b>	<b>Elective</b>	
	<b>B.Sc. in Mechanical Engineering</b>	<b>Elective</b>	
<b>Semester</b>	<b>Spring 2017-2018</b>		

<b>Course Code</b>	CE 501			
<b>Course Title in English</b>	Steel Structures			
<b>Course Title in Turkish</b>	Çelik Yapılar			
<b>Language of Instruction</b>	English			
<b>Type of Course</b>	Flipped Classroom/Lecture/Exercise /Project			
<b>Level of Course</b>	Undergraduate			
<b>Course Category (by % of Content)</b>	Basic Science	Basic Engineering	Engineering Design	General Education
	-	50	50	-
<b>Semester Offered</b>	Spring			
<b>Contact Hours per Week</b>	Lecture: 3 hours	Recitation: -	Lab:-	Other:-
<b>Estimated Student Workload</b>	130 hours per semester.			
<b>Number of Credits</b>	5 ECTS			
<b>Grading Mode</b>	Standard Letter Grade			
<b>Pre-requisites</b>	None			
<b>Expected Prior Knowledge</b>	Prior knowledge of strength of materials (STM 203) is suggested.			
<b>Co-requisites</b>	None			
<b>Registration Restrictions</b>	Undergraduate & Graduate Students			
<b>Overall Educational Objective</b>	To comprehend the design fundamentals of steel structures and the principles for proportioning of structural steel members and connections, to develop skills for 3D-imagining in design and proportioning processes and to develop the ability to implement the design fundamentals and proportioning principles on engineering problems.			
<b>Course Description</b>	This course focuses on the design of steel structures. The following major topics are covered: historical development of steel structures, introduction to steel structures, properties of structural steel, design principles for steel structures, safety, loads and load combinations, connections and fasteners, riveted and bolted connections, welded connections, tension members, splice connections in tension members, compression members, single compression members, built-up compression members, design of tie plates and lacing members, design of flexural members with rolled sections and their splice connections, built-up flexural members, members subject to combined axial force and bending moments, design of roof trusses, bracing systems for stability of roof trusses and connection details.			
<b>Course Description in Turkish</b>	Bu ders çelik yapılarının tasarımın üzerine yoğunlaşmaktadır. Çelik yapıların tasarımı, şu konu başlıkları altında kapsamlı bir şekilde incelenmektedir: çelik yapıların tarihçesi, çelik yapı sistemleri, malzeme olarak çelik, çelik yapıların tasarım esasları, güvenlik, yükler ve yük birleşimleri, birleşimler ve birleşim araçları, perçinli ve bulonlu birleşimler, kaynaklı birleşimler, çekme elemanları, çekme elemanlarının ek birleşimleri, basınç elemanları, tek parçalı basınç elemanları, çok parçalı basınç elemanları, çok parçalı basınç elemanlarında ara bağlantılar, eğilme			

	elemanları, hadde profilleri ile düzenlenen eğilme elemanları, eğilme elemanlarının ek birleşimleri, yapma enkesitli eğilme elemanları, eksenel kuvvet ve eğilme momentinin bileşik etkisindeki elemanlar, kafes kirişler, kafes kirişli çatı sistemlerinde stabilite bağlantıları ve birleşim detayları.	
<b>Course Learning Outcomes and Competencies</b>	<p>Upon successful completion of the course, the learner is expected to:</p> <ol style="list-style-type: none"> <li>1. Understand the structural steel material and the connection elements used.</li> <li>2. Define the loads affected on the structure and then to model the load combinations.</li> <li>3. Design the structural steel members under tension, compression and moments, make stress and stability control checks.</li> <li>4. Develop and design the steel connections.</li> <li>5. Design beams, trusses and stability bracings.</li> </ol>	
<b>Relation to Student Outcomes and Competencies: N=None S=Supportive H=Highly Related</b>		
<b>Relationship of the Course with the Student Outcomes and Competencies</b>	<b>Level</b>	<b>Assessed by</b>
	N/S/H (Related Learning Outcomes)	Exam, Project, HW, Lab, Presentation, etc.
(a) an ability to apply knowledge of mathematics, science, and engineering	H (1,2,3,4,5)	Midterm Exams, Quizzes, Term Project, Flipped Classroom Exercises
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	N	
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	H (1,2,3,4,5)	Midterm Exams, Quizzes, Term Project, Flipped Classroom Exercises
(d) an ability to function on multidisciplinary teams	N	
(e) an ability to identify, formulate, and solve engineering problems	H (1,2,3,4,5)	Midterm Exams, Quizzes, Term Project, Flipped Classroom Exercises
(f) an understanding of professional and ethical responsibility	N	
(g) an ability to communicate effectively	N	
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	S	Term Project, Flipped Classroom Exercises
(i) a recognition of the need for, and an ability to engage in life-long learning	S	Term Project
(j) a knowledge of contemporary issues	N	
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	H (1,2,3,4,5)	Term Project, Flipped Classroom Exercises
<b>Prepared by and Date</b>	Asst. Prof. Dr. İrem Zeynep Yıldırım / September 2016	
<b>Name of Instructors</b>		
<b>Course Contents</b>	<b>Week</b>	<b>Topic</b>
	1.	Introduction to Steel Structures and Historical development of steel structures, application areas of steel products, properties of structural steel
	2.	Information about steel design procedures, reliability, loads and load combinations , connections and fasteners or connectors.
	3.	Riveted and bolted connections
	4.	Welded Connections

	5.	Welded Connections																					
	6.	Tension members																					
	7.	Splice connections in tension members																					
	8.	Compression members																					
	9.	Single compression members & built-up compression members																					
	10.	Design of tie plates and lacing members																					
	11.	Design of flexural members with rolled sections																					
	12.	Splice connections in flexural members																					
	13.	Built-up flexural members (plate girders), members subject to combined axial force and bending moments (beam-columns)																					
	14.	Design of roof trusses, bracing systems for stability of roof trusses and connection details																					
	15.	Final Examination Period																					
	16.	Final Examination Period																					
Required/Recommended Readings	<p>Required Textbooks:</p> <ul style="list-style-type: none"> <li>Çelik Yapılar – 2007 Deprem Yönetmeliğine Uyarlanmış Emniyet Gerilmesi Esasına Göre Hesap, H.Deren, E.Uzgider, F. Piroğlu, B.Ö. Çağlayan, 4. Baskı , Çağlayan Kitapevi , 2012.</li> <li>Steel Structures Design and Behavior, C. G. Salmon, J. E. Johnson, F. A. Malhas, Fifth Edition, Prentice Hall, USA, 2009.</li> <li>Steel Design, W. T. Segui, Fift Edition, Global Engineering, USA, 2013.</li> <li>Design of Building Trusses, J. Ambrose, John Wiley and Sons, Inc., 1994.</li> </ul> <p>Recommended Textbooks:</p> <ul style="list-style-type: none"> <li>Steel Structures Design ASD/LRFD, A. Williams, McGraw Hill, USA, 2011.</li> <li>Unified Design of Steel Structures, L. Geschwindner, John Wiley &amp; Sons, New York, 2008</li> <li>Steel Designers Manual, Crosby lockwood Staples, London.</li> <li>Structural Steel Design, J. C. McCormac and S. F. Csernak, Fift Edition, Prentice Hall, New Jersey, 2012.</li> </ul>																						
Teaching Methods	Lectures/contact hours using "flipped classroom" as an active learning technique																						
Homework and Projects	1 Term Project																						
Laboratory Work	-																						
Computer Use	Students are encouraged to use computer for the structural analysis of the steel frame included in the term project.																						
Other Activities	-																						
Assessment Methods	<p>Types of assessment:</p> <table border="1"> <thead> <tr> <th></th> <th>Number</th> <th>Ratio (%)</th> </tr> </thead> <tbody> <tr> <td>Midterm Exam</td> <td>2</td> <td>20 (each contributing 10%)</td> </tr> <tr> <td>Quiz</td> <td>2</td> <td>10 (each contributing 5%)</td> </tr> <tr> <td>Flipped Classroom Practice</td> <td>5</td> <td>15 (each contributing 3%)</td> </tr> <tr> <td>Term Project</td> <td>1</td> <td>15</td> </tr> <tr> <td>Final Exam</td> <td>1</td> <td>40</td> </tr> <tr> <td>Total</td> <td></td> <td>100</td> </tr> </tbody> </table>			Number	Ratio (%)	Midterm Exam	2	20 (each contributing 10%)	Quiz	2	10 (each contributing 5%)	Flipped Classroom Practice	5	15 (each contributing 3%)	Term Project	1	15	Final Exam	1	40	Total		100
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Quiz	2	10 (each contributing 5%)																					
Flipped Classroom Practice	5	15 (each contributing 3%)																					
Term Project	1	15																					
Final Exam	1	40																					
Total		100																					
Course Administration	<p><b>Instructor's office and phone number:</b>  <b>office hours:</b>  <b>e-mail address:</b></p> <p><b>Rules for attendance:</b> Minimum of 70% attendance required. Classroom Practice contributes to 10% of the final grade.</p> <p><b>Missing a midterm:</b> Provided that proper documents of excuse are presented, each missed midterm by the student will be given the grade of the final exam. No make-up will be given.</p> <p><b>Missing the final project:</b> Faculty regulations.</p> <p><b>A reminder of proper classroom behavior, code of student conduct:</b> YÖK Regulations</p> <p><b>Statement on plagiarism:</b> YÖK Regulations  <a href="http://3fcampus.mef.edu.tr/uploads/cms/webadmin.mef.edu.tr/4833_2.pdf">http://3fcampus.mef.edu.tr/uploads/cms/webadmin.mef.edu.tr/4833_2.pdf</a></p>																						

**ECTS  
Student  
Workload  
Estimation**

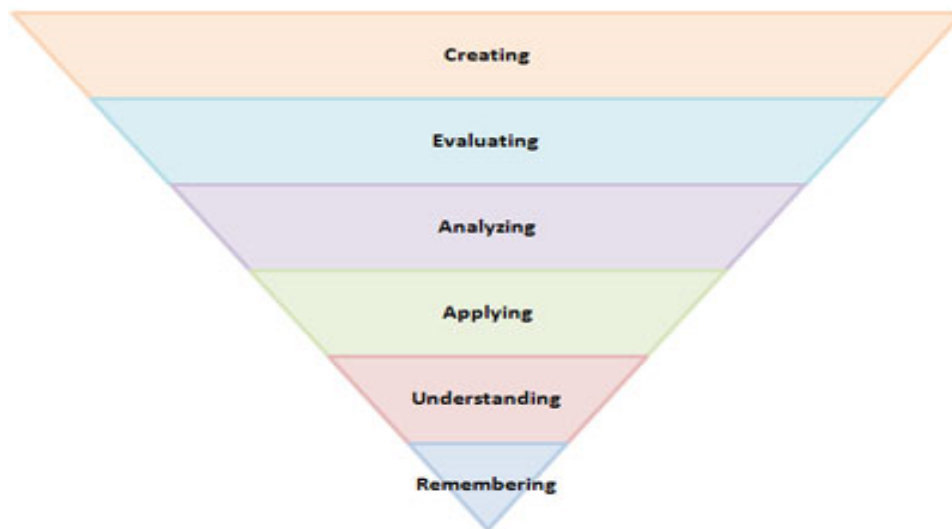
Activity	No/Weeks	Hours			Calculation	Explanation
		No/Weeks per Semester (A)	Preparing for the Activity (B)	Spent in the Activity Itself (C)		
Lecture/Flipped Classroom	14	1	3		56	$A*(B+C+D)$
Quizzes	2	3	0.45		6.9	$A*(B+C+D)$
Midterm(s)	2	10	1.5		23	$A*(B+C+D)$
Term Project	1	25	1		26	$A*(B+C+D)$
Final Examination	1	16	2		18	$A*(B+C+D)$
Total Workload					130	
Total Workload/25					5.196	
ECTS					5	

**PROGRAM CRITERIA**

1. Proficiency in a minimum of four recognized major areas of civil engineering; ability to conduct laboratory experiments and to critically analyze and interpret data in at least two of the recognized major civil engineering areas; ability to perform civil engineering design
2. Proficiency in mathematics through differential equations, probability and statistics, calculus-based physics, and general chemistry
3. Understanding of professional practice issues, such as procurement of work, bidding versus quality-based selection processes, how design professionals and construction professionals interact to complete a project; awareness of the importance of competency and continuing education

**Key verbs for cognitive domain in writing learning outcomes and competences:**

## Bloom's Taxonomy



Revised edition by Lorin Anderson (a student of Bloom)

**Key Verbs:**

Remembering: defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, selects, states.

Understanding: comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives an example, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates.

Applying: applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses.

Analyzing: analyzes, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, relates, selects, separates.

Evaluating: appraises, compares, concludes, contrasts, criticizes, critiques, defends, describes, discriminates, evaluates, explains, interprets, justifies, relates, summarizes, supports.

Creating: categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes.

**Key verbs for affective domain in writing learning outcomes and competences:**

Receiving Phenomena: asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, selects, sits, erects, replies, uses.

Responding to Phenomena: answers, assists, aids, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes.

Valuing: completes, demonstrates, differentiates, explains, follows, forms, initiates, invites, joins, justifies, proposes, reads, reports, selects, shares, studies, works.

Organizing: adheres, alters, arranges, combines, compares, completes, defends, explains, formulates, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes.

Internalizing values: acts, discriminates, displays, influences, listens, modifies, performs, practices, proposes, qualifies, questions, revises, serves, solves, verifies.