



REPUBLIC OF TURKEY  
KONYA TECHNICAL UNIVERSITY  
**Graduate Course Information Form**

<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Geotechnics</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222041004	Soil Stabilization and Soil Structures	X Fall ... Spring	T 3	P 0	ECTS 5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof. Dr. Mustafa Yıldız	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project	2	%20
	Midterm Exam	1	%30
	Final Exam	1	%50

<b>Course Objectives and Goals</b>	<p>The aim of this course is to improve the engineering properties of problematic soils—those with low bearing capacity and high settlement potential—using surface and deep improvement methods.</p> <p>The specific objectives are:</p> <ul style="list-style-type: none"> <li>• To define problematic soils.</li> <li>• To explain why soil improvement is necessary.</li> <li>• To introduce various soil improvement methods.</li> <li>• To determine the criteria for selecting appropriate improvement methods.</li> <li>• To identify the improved properties gained through stabilization.</li> </ul>
<b>Course Content</b>	<ol style="list-style-type: none"> <li>1. Introduction to Soil Stabilization</li> <li>2. Surface Soil Improvement Methods</li> <li>3. Compaction</li> <li>4. Stabilization with Lime, Cement, and Fly Ash</li> <li>5. Deep Soil Improvement Methods</li> <li>6. Preloading Method</li> <li>7. Vibroflotation Method</li> <li>8. Stone Column Method</li> <li>9. Midterm Exam</li> <li>10. Vibroflotation–Stone Column Applications</li> <li>11. Jet Grouting Method</li> <li>12. Injection Methods</li> <li>13. Geosynthetics</li> <li>14. Deep Mixing Method</li> </ol>

<p><b>Course Learning Outcomes</b></p>	<ol style="list-style-type: none"> <li>1. Understands the basic principles of soil stabilization.</li> <li>2. Learns how to select the appropriate soil improvement method according to the purpose of the work.</li> <li>3. Learns how to determine bearing capacity and settlement parameters of improved soils and use them in geotechnical design.</li> <li>4. Gains the ability to evaluate and interpret data from a geotechnical engineering perspective.</li> <li>5. Develops and deepens knowledge at the level of expertise in the field and understands interdisciplinary interactions.</li> <li>6. Gains the ability to carry out a study requiring geotechnical expertise.</li> </ol>
<p><b>Recommended Resources</b></p>	<ul style="list-style-type: none"> <li>• <i>Foundation Analysis and Design</i>, Joseph E. Bowles</li> <li>• Mitchell, J.K., "Stabilization of Soils for Foundations of Structures," Geotechnical Engineering, University of California, 1976.</li> <li>• Bell, F.G., <i>Engineering Treatment of Soils</i>, E &amp; FN Spon, London, 1993.</li> <li>• Prof. Dr. Bayram Ali Uzuner, <i>Introduction to Foundation Engineering</i></li> </ul>



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<b>Division/Program</b>	<b>Geotechnics</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222041008	Deep Excavations and Underground Structures	... Fall	T	P	ECTS
		X Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof. Dr. Mustafa Yıldız	X Turkish				
	... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project	2	%30
	Midterm Exam	1	%20
	Final Exam	1	%50

<b>Course Objectives and Goals</b>	<p>This course focuses on the importance and role of deep excavations in Geotechnical Engineering, the definition of the problems they create, the solution process, and related methods.</p> <ul style="list-style-type: none"> <li>To understand what deep excavations are</li> <li>To recognize stability problems in deep excavations</li> <li>To learn deep excavation support systems</li> <li>To understand the design and construction principles of deep excavations</li> <li>To identify common problems encountered in deep excavations</li> <li>To study underground structures such as metros, tunnels, tube crossings, and other underground facilities</li> </ul>
<b>Course Content</b>	<ol style="list-style-type: none"> <li>Deep excavations and support systems</li> <li>Design of deep excavations</li> <li>Lateral earth pressures – retaining structures</li> <li>Ground anchors</li> <li>Soil-nailed retaining walls</li> <li>Excavations supported with bentonite slurry</li> <li>Diaphragm walls</li> <li>Bored pile (secant pile) support systems</li> <li>Midterm exam</li> <li>Soldier piles – Berlin wall system</li> <li>Artificial ground freezing method</li> <li>Top-down construction method</li> <li>Shaft-type diaphragm walls</li> <li>Case studies from practice</li> </ol>

<p><b>Course Learning Outcomes</b></p>	<ol style="list-style-type: none"> <li>1. Understands the basic principles of deep excavation design.</li> <li>2. Learns how to select a suitable deep excavation support system according to project requirements.</li> <li>3. Learns the design and construction principles of selected support systems.</li> <li>4. Gains general knowledge about underground structures.</li> <li>5. Develops the ability to evaluate and interpret data from a geotechnical engineering perspective.</li> <li>6. Develops and deepens expertise-level knowledge in the field and understands interdisciplinary interactions.</li> <li>7. Gains the ability to conduct a study requiring geotechnical engineering expertise.</li> </ol>
<p><b>Recommended Resources</b></p>	<ul style="list-style-type: none"> <li>• <i>Foundation Analysis and Design</i>, Joseph E. Bowles</li> <li>• <i>Diaphragm Walls and Anchorages</i>, Anonymous</li> <li>• <i>Principles of Foundation Engineering</i>, B.M. Das</li> <li>• <i>Foundations, Retaining and Earth Structures</i>, G.P. Tchegotarioff</li> <li>• <i>Basic Soil Mechanics</i>, Prof. Dr. Bayram Ali Uzuner</li> </ul>



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Geotechnic</b>

M. Sc.		Semester (X)	Credit		
Course Code	Course Name		T	P	ECTS
8222041010	Experimental Methods in Soil Mechanics	X Fall ... Spring	3	0	5

Instructor (Title, Name Surname)	Language of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof. Dr. Murat OLGUN	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory	10	30
	Quiz		
	Assignment	10	30
	Project		
	Midterm Exam		
	Final Exam	1	40

<b>Course Objectives and Goals</b>	<p>This course aims to show students the experiments used in Soil Mechanics and Foundation Construction Applications and calculations, and to teach the principles of calculation and application of test results.</p> <p>Course objectives;</p> <ul style="list-style-type: none"> <li>- Introducing how Soil Mechanics Test Samples are prepared for experiments.</li> <li>- Introducing and implementing the necessary tests for the identification of soils</li> <li>- Introduction and implementation of experiments on compaction of soils</li> <li>- Introduction and implementation of experiments on bearing capacity and settlement problems of soils</li> <li>- Introduction and implementation of experiments on permeability properties of soils</li> </ul>
<b>Course Content</b>	<ol style="list-style-type: none"> <li>1-Introduction: Introduction to the Physical Properties of Soils</li> <li>2- Determination of Physical Properties of Soils in the Laboratory</li> <li>3- Determination of Unit Volume Weights of Soils in the Field</li> <li>4- Sieve Analysis and Wet Analysis</li> <li>5- Determination of Plasticity Properties of Soils</li> <li>6- Permeability tests (Constant and falling head)</li> <li>7- Determination of shear resistance (Unconfined Compression Test, Vane Shear Test)</li> <li>8- Direct Shear test</li> <li>9- Triaxial compression test</li> <li>10- Interpretation of shear strength tests</li> <li>11 - Compaction test</li> </ol>

	<p>12 –CBR test  13 - Consolidation test  14- Interpretation of consolidation test results  15- Final exam</p>
<b>Course Learning Outcomes</b>	<p>1. How to prepare test samples for Soil Mechanics experiments to be conducted in the laboratory is learned.  2. Details of the experiments to be conducted for the identification of soils are learned and laboratory practice is carried out.  3. The details of the test that needs to be performed for compaction of soils are learned and laboratory practice is carried out.  4. The details of the tests that need to be performed for determining the shear strength parameters of soils are learned and laboratory applications are carried out.  5. The details of the experiment that needs to be conducted to determine the consolidation parameters of the soils are learned and laboratory applications are carried out.  6. The details of the experiments that need to be conducted to determine the permeability properties of the soils are learned and laboratory applications are carried out.  7. The details of the experiments required to determine the bearing capacity properties of fillings used in road engineering are learned and laboratory practice is carried out.  8. Interpretation of Soil Mechanics test results</p>
<b>Recommended Resources</b>	<p>Experimental Soil Mechanics (Mustafa Aytakin)  Soil Mechanics (Bayram Ali Uzuner)</p>

**Edited by** : Prof. Dr. Murat OLGUN  
**Date** : 30/10/2025



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Geotechnical</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222041013	In-Situ Testing and Evaluation in Geotechnical Engineering	... Fall	T	P	ECTS
		X Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Asst. Prof. Dr. Atila DEMİRÖZ	... Turkish ... English	X		X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	2	10
	Project	1	10
	Midterm Exam	1	30
	Final Exam	1	50

<b>Course Objectives and Goals</b>	<p>In Geotechnical Engineering, it is aimed to conduct field experiments and to evaluate the results of these experiments. Selection of tools in the field in accordance with the structure and parameters to be observed, taking into account quality, cost and continuity.</p> <p>To ensure that the data to be obtained are interpreted and evaluated.</p>
<b>Course Content</b>	<ol style="list-style-type: none"><li>1-Introduction</li><li>2- Soil Investigation Planning</li><li>3- Borings and Soil Samples</li><li>4- In-situ Density Tests</li><li>5- Standard Penetration Tests (SPT)</li><li>6- Determination of Soil Parameters from SPT</li><li>7- Cone Penetration Test (CPT)</li><li>8- Determination of Soil Parameters from CPT</li><li>9- Plate Loading Test (PLT)</li><li>10- Pressiometer Tests (MPT)</li><li>11- Determination of Soil Parameters from PLT and MPT</li><li>12- Liquefaction Analyses with SPT and CPT</li><li>13-Dilatometer Tests</li><li>14- In-situ Permeability Test</li></ol>
<b>Course Learning Outcomes</b>	<ol style="list-style-type: none"><li>1. Acquisition of geotechnical field experiments and evaluation of experimental results.</li><li>2. Use of the results of geotechnical field experiments in geotechnical designs.</li><li>3. Gain the ability to perform the necessary instrumentation so that geotechnical parameters can be obtained on-site in the</li></ol>

	<p>most appropriate way in terms of cost and accuracy.</p> <ol style="list-style-type: none"> <li>4. Gain the ability to evaluate the data obtained from instrumentation.</li> <li>5. Will gain the ability to evaluate the data in terms of geotechnical engineering and to make it with interpretation.</li> <li>6. To develop and deepen their knowledge in the field at the level of expertise, to comprehend the interaction between disciplines.</li> <li>7. To be able to use the knowledge gained in the field.</li> <li>8. To be able to interpret this acquired information by integrating different disciplinary areas, to create new information and to produce solutions by using research methods to the problems encountered.</li> <li>9. 9. Ability to carry out a study that requires geotechnical expertise.</li> </ol>
<p><b>Recommended Resources</b></p>	<ul style="list-style-type: none"> <li>• Önalp, A., Sert, S., “Geoteknik Bilgisi III, Bina Temelleri”, Birsen Yayınevi, 2016.</li> <li>• Braja, M., Das, “Principles of Geotechnical Engineering”, Sixth Edition, Int, Thomson Publishing, 2006.</li> <li>• Braja, M., Das, “Advanced Soil Mechanics”, Third Edition, Taylor &amp; Francis London and New York, 2008.</li> <li>• V.N.S., Murthy, “Geotechnical Engineering I-II, Principles and Practices of Soil Mechanics and Foundation Engineering”, Marcel Dekker Incorporated, New York, USA, 2002.</li> <li>• V.N.S., Murthy, “Advanced Foundation Engineering”, CBS Publishers &amp; Distributors, New Delhi, Bangalore, India, 2010.</li> <li>• Josef, E., Bowles, “Foundation Analysis and Design”, Fifty Edition, The McGraw-Hill Companies, Inc., 1997.</li> <li>• Robert W., Day, Geotechnical Engineers Portable Handbook, Second Edition [Paperback], International Code Council, 2012.</li> <li>• Donald P. Coduto, “Foundation Design: Principles and Practices” [Hardcover], Prentice Hall Inc., New Jersey, 2001.</li> <li>• Donald P. Coduto, “Geotechnical Engineering: Principles and Practices” [Hardcover], Prentice Hall Inc., New Jersey, 1998.</li> </ul>



T.C.  
KONYA TECHNICAL UNIVERSITY  
GRADUATE EDUCATION INSTITUTE  
**Course Information Form**

<b>Institute</b>	<b>Institute of Graduate Studies</b>
<b>Department</b>	<b>Department of Civil Engineering</b>
<b>Program</b>	<b>Geotechnical</b>

Type of Program	Course Name	Semester	Credit		
<input checked="" type="checkbox"/> Master <input type="checkbox"/> Doctor	Geoenviremental Geotechnical	<input checked="" type="checkbox"/> Autumn <input type="checkbox"/> Spring	T 3	U 0	ETCZ 7,5

Instructor (Title, Name Surname)	Languages in which the course can be given	Course Type (X)	
Asst. Prof. Dr. Atila DEMİRÖZ	X Turkish <input type="checkbox"/> English <input type="checkbox"/> Other.....	Imperaitve	Optional <b>X</b>

Examination and Assessment Methods			
	Exams and Assesement Methodds	Number	Percentage (%)
	Laboratory		
	Oral exam		
	Midterm (written exam)	<b>1</b>	<b>30</b>
	Project + OralProject + Oral	<b>1</b>	<b>30</b>
	Yazılı Sınav	<b>2</b>	<b>40</b>
	Other (.....)		

<b>Course aims and objectives</b>	<p>Environmental pollution, which is becoming increasingly important today, controlled storage of domestic and industrial wastes, geotechnical design of the necessary structures for storage and controlled storage of industrial wastes, transfer of the use of basic engineering applications to the students.</p> <p>Formation of Wastes, Standards and Legal Regulations Related to Solid Wastes, Site Selection in terms of Geotechnical Engineering, Geotechnical Index Properties of Wastes and Soils, Strength and Compression Properties of Wastes, Environmental Soil Investigations, Relationship between Gas and Leachate Formation and Soil Structure, Hydraulic Properties of Domestic, Industrial Wastes and Soils, Improvement and Stabilization of Existing Solid Waste Storage Sites, Geotechnical Design Principles of Solid Waste Storage Sites, Stability Analysis and Design of Solid Waste Fillings, Settling of Waste and Soils, Geotechnical Properties of Fly Ashes and Use in Construction Applications, Examples from Application.</p>
<b>Course Content</b>	<ol style="list-style-type: none"><li>1. History of environmental geotechnical,</li><li>2. Forms of waste</li><li>3. Types of waste</li><li>4. Regulations for solid waste disposal,</li><li>5. Site selection for geotechnical engineering and design criteria,</li><li>6. Index properties of soils and waste,</li><li>7. Strength and consolidation properties of waste,</li><li>8. Seepage and pollution at disposal site,</li><li>9. Site investigation,</li><li>10. Gas and seepage water formations,</li></ol>

	<p>11. Hydraulic properties of soils and domestic and industrial wastes.</p> <p>12. Improvement of disposal site.</p> <p>13. Geotechnical design of solid waste landfill site.</p> <p>14. Cases studies.</p>	
<b>Course Description</b>	<ol style="list-style-type: none"> <li>1. The student will have sufficient knowledge in mathematics, science and subjects specific to the relevant engineering discipline; gain the ability to use theoretical and practical knowledge in these areas in complex engineering problems. To be able to define the functions of geosynthetics in civil engineering.</li> <li>2. The student gains the ability to identify, define, formulate and solve complex engineering problems; have the ability to select and apply appropriate analysis and modeling methods for this purpose. To be able to define and interpret the parameters required to obtain the engineering properties of geosynthetics.</li> <li>3. The student gains knowledge about geotechnical environmental engineering applications.</li> <li>4. The student gains the knowledge of developing special designs to solve the problems encountered in practice.</li> <li>5. Civil engineering students are brought to the Geotechnical Engineering specialization area.</li> </ol>	
<b>Teaching Methods</b>	Theoretical	
<b>Book(s) to Follow</b>	<ul style="list-style-type: none"> <li>• R. B., Koerner, "Desinging with Geosynthetics, Prentice Hall, New Jersey, 2005.</li> <li>• I, S., Oweis and P, K., Khara, "Geotechnology of Waste Management, Butterworth's Publication, Cambridge, UK., 1990.</li> <li>• G, Tchobanoglous, H., Theisen, S, A., Vigil, "Integrated Solid Waste Management", Engineering Principles and Management Issues, McGraw-Hill International Editions Civil Engineering Series, Singapore, 1993.</li> <li>• H, D., Sharma, S, P., Lewis, "Waste Containment Systems, Waste Stabilization and Landfills: Design and Evaluation", John Wiley &amp; Sons, 1994.</li> <li>• D, E., Daniel, "Geotehcnical Practice for Waste Disposal", Published by Chapman and Hall, Boundary Row, London, 1993.</li> <li>• Edited, R, D., Woods, "Geotechnical Practice for Waste Disposal'87" Geotechnical Special Publication No:13, ASTM, New York, 1987.</li> </ul>	
<b>Content Weights Percentage (%)</b>	<b>Mathematics and Basic Sciences</b>	% ....
	<b>Engineering Sciences</b>	% 60
	<b>Engineering Design</b>	% 40
	<b>Social Sciences</b>	% ....

T: Theory; U: Application; ECTS: European Credit Transfer System (European Credit Transfer Sys.)

<b>Course Name – Code:</b>				
<b>Program Outcomes</b>		1	2	3
1	An ability to apply knowledge of mathematics, science and engineering			x
2	An ability to design and conduct experiments, as well as analyze and interpret data			x
3	An ability to design a system, component on process to meet desired needs			x
4	An ability to function on multi-disciplinary teams		x	
5	An ability to identify, formulate and solve engineering problems			x
6	An understanding of professional and ethical responsibility		x	
7	An Ability to communicate effectively in English and Turkish		x	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal contents		x	

9	A recognition of the need for and ability to engage in life-long learning			x
10	A knowledge of contemporary issues			x
11	An ability to use the techniques skills and modern engineering tools necessary for engineering practice			x
<b>Course Contribution:</b> 1: Never 2: Partial 3: Completely				

Regulate : Asst. Prof. Dr. Atila DEMİRÖZ

Tarih : 14/10/2025



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Geotechnical</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222041015	Geosynthetics in Civil Engineering	X Fall	T	P	ECTS
		... Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Asst. Prof. Dr. Atila DEMİRÖZ	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	1	30
	Project		
	Midterm Exam	1	20
	Final Exam	1	50

<b>Course Objectives and Goals</b>	<p>Geosynthetics, which are considered as "Miracle Materials", are successfully used in geotechnical engineering in an increasing and widespread way in many construction sites of our country and in the world. Geosynthetic materials are one of the most rapidly developing and changing materials that have been frequently used in recent years.</p> <p>Polymeric materials produced under factory conditions play an important role in the implementation of geotechnical projects by using them together with the ground and can offer aesthetic solutions by increasing the environment performance and reducing costs compared to traditional methods. It is aimed to use geosynthetics, which have gained a place with a wide range of material families, in various application areas of basic engineering and to transfer design</p>
<b>Course Content</b>	<p>General description.</p> <ol style="list-style-type: none"> <li>2. Geosynthetics: the history and development,</li> <li>3. Manufacture,</li> <li>4. Physico, mechanical chemical and hydraulic properties,</li> <li>5. Current Uses,</li> <li>6. Project realization,</li> <li>7. Properties and test methods for geotextile, geomembrane, geogrid, geonet and geocomposite.</li> <li>8. Application areas,</li> <li>9. Soil improvement,</li> <li>10. Geosynthetics under railway,</li> <li>11. Designing and usage for geosynthetics to separation,</li> <li>12. Reinforced walls,</li> </ol>

	<p>13. Embankments of soft soil, filtration and drainage. Solid waste management.</p> <p>14. Case studies</p>
<b>Course Learning Outcomes</b>	<p>1. To be able to define the types and basic properties of geosynthetics.</p> <p>2. To be able to define the functions of geosynthetics in civil engineering.</p> <p>3. Ability to design with geosynthetics in civil engineering applications.</p> <p>4. To be able to define and interpret the parameters required to obtain the engineering properties of geosynthetics.</p> <p>5. Describes the basic functions of geotextiles.</p> <p>6. Explains the filtration mechanisms of geosynthetics</p>
<b>Recommended Resources</b>	<ul style="list-style-type: none"> <li>• Önalp, A., Sert, S., "Geoteknik Bilgisi III, Bina Temelleri", Birsen Yayınevi, 2016.</li> <li>• Mollamahmutoğlu, M., Babuccu, F., "Zeminlerde Sıvılaşma", Gazi Kitabevi, 2006.</li> <li>• Braja, M., Das, "Principles of Geotechnical Engineering", Sixth Edition, Int, Thomson Publishing, 2006.</li> <li>• Braja, M., Das, "Advanced Soil Mechanics", Third Edition, Taylor &amp; Francis London and New York, 2008.</li> <li>• V.N.S., Murthy, "Geotechnical Engineering I-II, Principles and Practices of Soil Mechanics and Foundation Engineering", Marcel Dekker Incorporated, New York, USA, 2002.</li> <li>• V.N.S., Murthy, "Advanced Foundation Engineering", CBS Publishers &amp; Distributors, New Delhi, Bangalore, India, 2010.</li> <li>• Josef, E., Bowles, "Foundation Analysis and Design", Fifty Edition, The McGraw-Hill Companies, Inc., 1997.</li> <li>• Robert W., Day, Geotechnical Engineers Portable Handbook, Second Edition [Paperback], International Code Council, 2012.</li> <li>• Donald P. Coduto, "Foundation Design: Principles and Practices" [Hardcover], Prentice Hall Inc., New Jersey, 2001.</li> <li>• Donald P. Coduto, "Geotechnical Engineering: Principles and Practices" [Hardcover], Prentice Hall Inc., New Jersey, 1998.</li> </ul>



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<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Geotechnic</b>

M. Sc. ...		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222041016	Geotechnic Applications in Practice	... Fall	T	P	ECTS
		X Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
Ass. Prof. Atila DEMİRÖZ	X Turkish	Must	Elective	Face to face	Online
	... English		√		

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	3	30
	Project		
	Midterm Exam	1	30
	Final Exam	1	40

<b>Course Objectives and Goals</b>	The evaluation of problems encountered in geotechnic and solution methods of these problems taking into account applications in practice.
<b>Course Content</b>	1-Introduction 2- Compaction of Soils and the Engineering Properties of Compacted Soils 3-Quality-Control Procedures in Backfills 4- Slope Stability Analysis and the Parameters Used in Stability Analysis 5-Retaining Structures and Application Areas of Theirs 6-Bearing Capacity of Cohesive Soils 7- Bearing Capacity of Cohesionless Soils 8- Settlement and Consolidation in Soils 9- Stabilization Methods in Cohesive Soils 10- Stabilization Methods in Cohesionless Soils 11- Pile Foundation Applications in Practice 12- Injection Practices in Soils 13- Soil Nailing and Anchors 14-Geotextiles
<b>Course Learning Outcomes</b>	1. Knows the need for different types of foundations. 2. It designs shallow and deep foundations under the effects of different loads. 3. Designs retaining structures. 4. Makes the design of foundations for dynamic loads. 5. To be able to make the basic design with soil and rock parameters. 6. To be able to calculate the basic capacity with soil and rock parameters.

	<ol style="list-style-type: none"><li>7. Learning the applications of various types of foundations.</li><li>8. Learning to apply basic design on problematic grounds.</li><li>9. Learning soil improvement methods.</li></ol>
<b>Recommended Resources</b>	Foundation Analysis and Design, J. E. Bowles Soil Mechanics and Foundation Engineering Congress Booklets



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Geotechnical</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222041019	Ground Injection Techniques	... Fall	T	P	ECTS
		... Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Asst. Prof. Atila DEMİRÖZ	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	1	30
	Project		
	Midterm Exam	1	20
	Final Exam	1	50

<b>Course Objectives and Goals</b>	Learning injection applications in the solution of soil problems and using them in practice.
<b>Course Content</b>	<ol style="list-style-type: none"> <li>1. Definition of injection applications on floors,</li> <li>2. Grounds for injection on floors</li> <li>3. Types of injections on floors</li> <li>4. Drilling required for injection Application areas,</li> <li>5. Preparation of injection fluid</li> <li>6. Injection pumping on floors,</li> <li>7. Determination of the necessary processes for injection pumping in floors</li> <li>8. Description of injection mixtures</li> <li>9. the choice of injection mixtures depending on the type of floor,</li> <li>10. Pumps and accessories required for injection</li> <li>11. Control of injection pressure on different floors</li> <li>12. Filler injections</li> <li>13. Curtain injections</li> <li>14. Injection control</li> </ol>
<b>Course Learning Outcomes</b>	<ol style="list-style-type: none"> <li>1. Definition of injection applications on floors,</li> <li>2. Grounds for injection on floors</li> <li>3. Types of injections on floors</li> <li>4. Drilling required for injection, application areas,</li> <li>5. Preparation of injection fluid</li> <li>6. Injection pumping on floors,</li> <li>7. Determination of the necessary processes for injection pumping in floors</li> <li>8. Description of injection mixtures</li> </ol>

	<ol style="list-style-type: none"> <li>9. the choice of injection mixtures depending on the type of floor,</li> <li>10. Pumps and accessories required for injection</li> <li>11. Control of injection pressure on different floors</li> <li>12. Filler injections</li> <li>13. Curtain injections</li> <li>14. Injection control</li> </ol> <ol style="list-style-type: none"> <li>1. Learning injection applications in solving floor problems</li> <li>2. Learning injection mixtures</li> <li>3. Learning the choice of injection mixtures depending on the type of floor</li> <li>4. Learning the preparation of the injection fluid</li> <li>5. Learning injection control</li> <li>6. Knowing the types of injections on floors</li> <li>7. Knowledge of the processes required for injection pumping in floors.</li> <li>8. Learning to control the injection pressure on different floors</li> <li>9. Learning filler injections</li> <li>10. Learning curtain injections explains the filtration mechanisms.</li> </ol>
<p><b>Recommended Resources</b></p>	<ul style="list-style-type: none"> <li>• Bell, F.G., Engineering Treatment of Soils, E&amp;FN SPON, London, 1993.</li> <li>• Tunçdemir, Fatih. Temel Zeminlerinin Enjeksiyon Tekniğiyle İyileştirilmesi, İMO</li> <li>• Erol, O., Çekinmez, B, Z., 2018, Jet Enjeksiyon Yöntemi, Yüksel Proje Uluslararası A.Ş., Ankara.</li> <li>• Miki, G. (1982). The newest techniques on chemical grouting and jet grouting. In Proceedings of the Symposium on Recent Development in Ground Improvement Techniques (pp. 279-288).</li> <li>• Bergschneider, B. ve Walz, B. (2003). “Jet Grouting: Range of the Grouting Jet”, editörler Vanicek vd., Proceedings of the 13th European Conference on Soil Mechanics and Foundation Engineering: Prag, Czech, Geotechnical Society: p. 53 – 56</li> </ul>



REPUBLIC OF TURKEY  
KONYA TECHNICAL UNIVERSITY  
Graduate Course Information Form

<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Geotechnical</b>

M. Sc. ...		Ph.D. X			
Course Code	Course Name	Semester (X)	Credit		
8222041020	Advanced Foundation Engineering	X Fall	T	P	ECTS
		... Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Asst. Prof. Dr. Atila DEMİRÖZ	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	1	10
	Project		
	Midterm Exam	1	30
	Final Exam	1	60

<b>Course Objectives and Goals</b>	<p>Since Turkey is an earthquake country and because the foundation designs were usually made without the lack of knowledge and information of earthquake, in this course it is aimed to give the fundamentals of structure foundations (according to the static and dynamic forces) how to design them properly and economically to the engineers.</p> <p>It is also aimed to give the ability of how to solve the civil engineering problems as secure, economic, aesthetic and environmental factors considered, and teach the most basic and advanced engineering and theoretical-practical information to the students.</p>
<b>Course Content</b>	<ol style="list-style-type: none"><li>1. Introduction</li><li>2. Classification of Foundations</li><li>3. Performance criteria at foundation</li><li>4. Ultimate Bearing Capacity of Shallow Foundations</li><li>5. Settlement at Shallow Foundation</li><li>6. Structural and Geotechnical Design of Mat Foundation</li><li>7. Footing and Caisson Foundations</li><li>8. Poor and Compactable Foundations</li><li>9. Foundations at swelling soils</li><li>10. Foundations at collapsible soils</li><li>11. Machine Foundations</li><li>12. Reinforced Earth Structures</li><li>13. Soil Improvement</li><li>14. Examples from practical</li></ol>

<p><b>Course Learning Outcomes</b></p>	<ol style="list-style-type: none"> <li>1. Knows the need for different types of foundations.</li> <li>2. It designs shallow and deep foundations under the effects of different loads.</li> <li>3. Designs retaining structures.</li> <li>4. Makes the design of foundations for dynamic loads.</li> <li>5. To be able to make the basic design with soil and rock parameters.</li> <li>6. To be able to calculate the basic capacity with soil and rock parameters.</li> <li>7. Learning the applications of various types of foundations.</li> <li>8. Learning to apply basic design on problematic grounds.</li> <li>9. Learning soil improvement methods.</li> </ol>
<p><b>Recommended Resources</b></p>	<ul style="list-style-type: none"> <li>• Önalp, A., Sert, S., "Geoteknik Bilgisi III, Bina Temelleri", Birsen Yayınevi, 2016.</li> <li>• Mollamahmutoğlu, M., Babuccu, F., "Zeminlerde Sıvılaşma", Gazi Kitabevi, 2006.</li> <li>• Braja, M., Das, "Principles of Geotechnical Engineering", Sixth Edition, Int, Thomson Publishing, 2006.</li> <li>• Braja, M., Das, "Advanced Soil Mechanics", Third Edition, Taylor &amp; Francis London and New York, 2008.</li> <li>• V.N.S., Murthy, "Geotechnical Engineering I-II, Principles and Practices of Soil Mechanics and Foundation Engineering", Marcel Dekker Incorporated, New York, USA, 2002.</li> <li>• V.N.S., Murthy, "Advanced Foundation Engineering", CBS Publishers &amp; Distributors, New Delhi, Bangalore, India, 2010.</li> <li>• Josef, E., Bowles, "Foundation Analysis and Design", Fifty Edition, The McGraw-Hill Companies, Inc., 1997.</li> <li>• Robert W., Day, Geotechnical Engineers Portable Handbook, Second Edition [Paperback], International Code Council, 2012.</li> <li>• Donald P. Coduto, "Foundation Design: Principles and Practices" [Hardcover], Prentice Hall Inc., New Jersey, 2001.</li> <li>• Donald P. Coduto, "Geotechnical Engineering: Principles and Practices" [Hardcover], Prentice Hall Inc., New Jersey, 1998.</li> </ul>



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**Graduate Course Information Form**

<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Geotechnic</b>

<b>M. Sc.</b>		<b>Semester (X)</b>	<b>Credit</b>		
<b>Course Code</b>	<b>Course Name</b>		T	P	ECTS
8222041021	Deep Foundations	.... Fall X Spring	3	0	5

<b>Instructor</b> (Title, Name Surname)	<b>Language of Instruction (X)</b>	<b>Course Type (X)</b>		<b>Mode of Course (X)</b>	
		Must	Elective	Face to face	Online
Prof. Dr. Murat OLGUN	X Turkish ... English		X	X	

<b>Assessment and Evaluation Methods</b>			
	<b>Evaluation Method</b>	<b>Number</b>	<b>Percentage (%)</b>
	Laboratory		
	Quiz		
	Assignment	3	20
	Project		
	Midterm Exam	1	30
	Final Exam	1	50

<b>Course Objectives and Goals</b>	<p>This course aims to teach students the calculation and application principles of deep foundation applications to be carried out in soil conditions where bearing capacity and settlement problems exist.</p> <p>Course objectives;</p> <ul style="list-style-type: none"><li>- Determining Deep Foundation Application requirements</li><li>- Introduction of deep foundation application methods</li><li>- Explaining the calculation methods of deep foundation applications</li><li>- Detailing the field applications of deep foundation applications</li><li>- Explaining the quality control experiments of deep foundation applications</li></ul>
<b>Course Content</b>	<ol style="list-style-type: none"><li>1- Introduction: Application reasons and functions of deep foundations</li><li>2- Types of deep foundation applications</li><li>3- Vertical load carrying functions of deep foundations</li><li>4- Lateral load support functions of deep foundations</li><li>5- Deep foundation applications against liquefaction</li><li>6- Group effect on deep foundations</li><li>7- Deep foundation applications against settlement</li><li>8- Calculation principles of pile foundation applications</li><li>9- Deep mixing column applications</li><li>10 - Jet grout column applications</li><li>11- Deep foundation applications in expansive soils</li><li>12- Deep foundation application examples</li><li>13- Quality control methods in deep foundation applications</li><li>14- Durability conditions in deep foundation applications</li><li>15-Final exam</li></ol>

<b>Course Learning Outcomes</b>	<ol style="list-style-type: none"> <li>1. It is learned in which soil environment and conditions Deep Foundations are required and the necessity of their application arises.</li> <li>2. It is learned which of the deep foundation systems is preferred and applicable depending on the soil condition and loading situations.</li> <li>3. Calculation principles and methods of deep foundation systems are learned.</li> <li>4. Application of deep foundation systems in the field and manufacturing methods are learned in detail.</li> <li>5. Durability and strength properties of deep foundation systems are detailed.</li> <li>6. Quality control tests in deep foundation systems are learned in detail.</li> <li>7. Applications projects in deep foundation systems are learned.</li> </ol> <p>Deep foundation systems applications are monitored on site in the field.</p>
<b>Recommended Resources</b>	<p>Pile Foundations (Ergun Tođrol)  Pile Foundations (Altay A. Birand)  Geotechnical Knowledge III, Building Foundations (Akin Onalp)</p>

**Edited by** : Prof. Dr. Murat OLGUN  
**Date** : 28/10/2025

<b>Institute</b>	<b>Institute of Graduate Studies</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Program</b>	<b>Hydraulic</b>

Program Type	Course Name	Semester	Credits		
<input checked="" type="checkbox"/> Master <input type="checkbox"/> Doctorate	Physical Hydrology	<input checked="" type="checkbox"/> Autumn <input type="checkbox"/> Spring	T	L	ECTS
			3	0	7,5

Instructor	Language	Course Status (X)	
Prof. Dr. Nermin ŞARLAK	<input type="checkbox"/> Turkish	Required	Elective
	<input type="checkbox"/> English		
	<input type="checkbox"/> Other.....		<b>x</b>

Methods of Assessment			
	Exams and Assessment Methods	Number	Percentage (%)
	Laboratory	-	-
	Oral exam	-	-
	Homework + Oral exam	<b>3</b>	<b>20</b>
	Project + Oral exam	-	-
	Written exam	<b>2</b>	<b>80</b>
	Other (.....)	-	-

<b>Course Objectives</b>	To obtain an understanding and appreciation of hydrology as a quantitative science describing the occurrence, distribution and movement of water at and near the surface of the earth; Develop a sound intuitive and quantitative understanding of the physical processes involved in the land phase of the hydrologic cycle; Learn how to use these knowledge to address engineering problems.
<b>Course Content</b>	1- Definition of hydrology, Hydrologic cycle, Conservation laws, Error assessment, 2- The climate system: radiation, energy balance, greenhouse effect, El Nino South oscillation (ENSO), 3- Climate system continued, 4- Precipitation: Mechanism of precipitation, 5- Precipitation data analysis, Measurement and areal averaging, Probable maximum precipitation, 6- Sample problem solving, 7-Mechanism of evaporation, 8-Snow, 9- Physical factors in the generation of runoff, 10- Runoff measurement and data analysis, 11- Infiltration, 12- Water in soil, 13- Routing surface runoff to a basin outlet, 14- Sample problem solving.
<b>Course Outcomes</b>	Comment on the hydrological cycle: where does the water come and where does it go? Establish the rainfall- runoff relationship; Conduct the flood and hydrograph analysis.

**Books & Materials**

Dingman, S.L. (2002) "Physical Hydrology"; Bras, R.L (1990) "Hydrology, An introduction to hydrologic science"; Chow, V. T., D. R. Maidment and L. W. Mays (1988), "Applied Hydrology".



REPUBLIC OF TURKEY  
KONYA TECHNICAL UNIVERSITY  
INSTITUTE OF GRADUATE STUDIES  
**Course Datasheet**

<b>Institute</b>	<b>Institute of Graduate Studies</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Program</b>	<b>Hydraulic</b>

Program Type	Course Name	Semester	Credits		
<input checked="" type="checkbox"/> Master <input type="checkbox"/> Doctorate	Probabilistic and Statistical Methods in Water Resources Engineering	<input type="checkbox"/> Autumn <input checked="" type="checkbox"/> Spring	T	L	ECTS
			3	0	7,5

Instructor	Language	Course Status (X)	
Prof. Dr. Nermin ŞARLAK	<input type="checkbox"/> Turkish	Required	Elective
	<input type="checkbox"/> English		
	<input type="checkbox"/> Other.....		<b>x</b>

Methods of Assessment			
	Exams and Assessment Methods	Number	Percentage (%)
	Laboratory	-	-
	Oral exam	-	-
	Homework + Oral exam	<b>3</b>	<b>20</b>
	Project + Oral exam	-	-
	Written exam	<b>2</b>	<b>80</b>
	Other (.....)	-	-

<b>Course Objectives</b>	The course is for master students who need knowledge of probabilistic and statistical methods in their thesis. The level of understanding will, upon completion of the course, be sufficient to understand and comprehension the important issues in the current literature on models where statistical and probability methods are used in prediction and interpretation of water resources engineering problems.
<b>Course Content</b>	1- Introduction, 2- Random variables, 3- Basic probability, 4-Multiple random variables and joint distributions: Conditional and joint probability, 5- Probability distribution functions, 6- The parameters of probability distribution functions, 7-Hyphotesis, 8- Regression, 9- Multiple regression, 10- Time series models: Univariate and multivariate, 11-Parameter estimation techniques: Least square, method of moments, maximum likelihood, and L-moments, 12- Tests of goodness of fit: independence, Porte manteau test, Normality test; skewness test, parsimony of parameters, Akaike information criteria, 13- Autoregresive model (AR): Annual AR model, estimation of parameters, 14- Generation of synthetic time series.
<b>Course Outcomes</b>	By the end of this course students should be able to conceive the knowledge involved in the analysis, visualization, hypothesis testing and simulation required for application of probabilistic and statistical methods in water resources engineering.

**Books & Materials**

- Kottegoda, N. T. and R. Rosso, (1997), Statistics, Probability, and Reliability for Civil and Environmental Engineers, McGraw-Hill, New York, 735 p.
- Yevjevich, V. (1972a) "Probability and Statistics in Hydrology" Water Resources Publ., Fort Collins, Colorado,
- Bayazit, M. (1981) "Hidrolojide İstatistik Yöntemler" ITU matbaası.



REPUBLIC OF TURKEY  
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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Hydraulic</b>

M. Sc. (X)		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222001026	Physically Based Hydrological Modeling	... Fall	T	P	ECTS
		(X) Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Assoc. Prof. Dr. Cihangir KÖYCEĞİZ	(X) Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	1	50
	Project	1	50
	Midterm Exam		
	Final Exam		

<b>Course Objectives and Goals</b>	<p>This course aims to introduce students to the basic principles of physically based models used in solving hydrological problems and to provide knowledge on preparing input data, model building, and interpreting outputs.</p> <p>Course objectives:</p> <ul style="list-style-type: none"><li>- To examine the basic components of the hydrological cycle and introduce relevant physical approaches</li><li>- To introduce common problems addressed by physically based hydrological models and their operating principles</li><li>- To construct the input set for a physically based hydrological model, run the model, and interpret the outputs</li><li>- To examine the impact of climate change and land cover changes on the hydrological cycle</li></ul>
<b>Course Content</b>	<ol style="list-style-type: none"><li>1- Introducing the basic components of the hydrological cycle</li><li>2- Introducing the fundamental physical principles that form the hydrological cycle</li><li>3- Introducing types of hydrological models and their basic operating principles</li><li>4- Spatial and temporal scaling in physically based hydrological models</li><li>5- To build a meteorological input set for a physically based hydrological model (PBHM)</li><li>6- To build the physical input set for PBHM, including geological, land cover, vegetation, etc.</li><li>7- Introducing the model parameters of PBHM and examining their</li></ol>

	<p>effect on the model</p> <p>8- To examine calibration and validation processes in hydrological models</p> <p>9- Assignment</p> <p>10- Running and calibrating the PBHM</p> <p>11- To examine the physical consistency of PBHM outputs with each other and to interpret PBHM outputs</p> <p>12- Temporal visualization of FTHM outputs</p> <p>13- Spatial analysis and visualization of FTHM outputs</p> <p>14- To analyze the hydrological effects of climate change using PBHM</p> <p>15- To analyze the effect of vegetation changes on the water budget using PBHM</p> <p>16- Project</p>
<b>Course Learning Outcomes</b>	<p>1- To be able to determine a hydrological model capable of generating solutions according to the hydrological problem</p> <p>2- To be able to distinguish the necessity of constructing a physically based hydrological model</p> <p>3- To be able to run a physically based hydrological model</p> <p>4- To be able to interpret model outputs comparatively</p> <p>5- To be able to indicate the effects of climate and human-based variables on the hydrological cycle</p>
<b>Recommended Resources</b>	<p>1- Physical Hydrology, S. Lawrence Dingman</p> <p>2- The SAGE handbook of remote sensing, Timothy A Warner, M Duane Nellis, Giles M Foody</p> <p>3- Hidrolojik modeller, Mehmetçik Bayazıt</p> <p>4- Course notes</p>



REPUBLIC OF TURKEY  
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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Hydraulic</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222001029	EXPERIMENTAL AND NUMERICAL MODELLING OF HYDRAULIC STRUCTURES	X Fall	T	P	ECTS
		... Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Assist. Prof. Ali YILDIZ	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory	2	%40
	Quiz	-	-
	Assignment	2	%40
	Project	3	%60
	Midterm Exam	-	-
	Final Exam	-	-

<b>Course Objectives and Goals</b>	To introduce the experimental and numerical modelling methods used to understand the behaviour of hydraulic structures, conduct design and performance analyses, teach the theoretical foundations, application areas, and limitations of these methods, and enable students to competently use them in scientific research and engineering design processes.
<b>Course Content</b>	<ol style="list-style-type: none"> <li>1. Introduction and Basic Concepts: What is a hydraulic structure? Types and functions; concepts of experimental and numerical modelling; distinction between real systems, physical models, and numerical models; introduction to scaling and similarity principles.</li> <li>2. Principles of Physical (Experimental) Modelling: Froude and Reynolds similarities; dimensional analysis (Buckingham <math>\pi</math> theorem); key considerations in setting up physical models.</li> <li>3. Laboratory Equipment and Measurement Techniques: Flow meters, piezometers, wave probes, velocity measurement devices (ADV, PIV, etc.); experimental data collection and error analysis; calibration of measurement systems.</li> <li>4. Experimental Modelling Applications I: Free-surface flows; surface flood modelling; simple channel and weir models.</li> <li>5. Experimental Modelling Applications II: Energy dissipating structures (hydraulic jump); spillways and energy dissipation; downstream structures of dams.</li> <li>6. Introduction to Numerical Modelling: Types of numerical models</li> </ol>

	<p>(CFD, FEM, FDM, FV methods); mesh structure; time step and solution accuracy; software and tools (HEC-RAS, FLOW-3D, OpenFOAM, ANSYS Fluent, etc.).</p> <ol style="list-style-type: none"> <li>7. Numerical Modelling – Free Surface Flows: Shallow Water Equations (SWE) and Navier-Stokes equations; boundary and initial conditions; 1D, 2D, and 3D modelling approaches.</li> <li>8. Numerical Modelling – Turbulence and Flow Regimes: Turbulence models (k-<math>\epsilon</math>, k-<math>\omega</math>, LES, DNS); effects of turbulence on structures; density differences and multiphase flows.</li> <li>9. Model Calibration and Validation: What is model calibration? Comparison of experimental and numerical models; sources of error and solutions.</li> <li>10. CFD Modelling of Simple Hydraulic Structures: Introductory spillway or channel CFD model; mesh generation; definition of boundary conditions; running simulations and analyzing results.</li> <li>11. Hydraulic Jump Simulation in Energy Dissipating Structures: Modelling hydraulic jumps; free surface detection; analysis of high energy dissipation regions.</li> <li>12. Introduction to Numerical Optimization Techniques: Parameter optimization (e.g., genetic algorithm, PSO); applications of optimization in hydraulic structure design; automation and parametric analyses.</li> <li>13. Integration of Experimental and Numerical Methods: Calibrating numerical models using real model data; hybrid modelling examples; introduction to machine learning and data-driven approaches.</li> <li>14. Student Presentations and Evaluation: Experimental or numerical model of a selected structure; project presentations; feedback and general evaluation.</li> </ol>
<p><b>Course Learning Outcomes</b></p>	<ol style="list-style-type: none"> <li>1. Define the classification, functions, and behavioural principles of hydraulic structures.</li> <li>2. Create, run, and interpret numerical models of hydraulic structures using software packages.</li> <li>3. Develop more realistic and reliable engineering solutions by integrating experimental and numerical methods.</li> </ol>
<p><b>Recommended Resources</b></p>	<ul style="list-style-type: none"> <li>• Chanson, H. (2004). The Hydraulics of Open Channel Flow: An Introduction.</li> <li>• Ferziger, J.H., Peric, M., &amp; Street, R.L. (2020). Computational Methods for Fluid Dynamics.</li> </ul>



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Hydraulic</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222031002	Planning and Design of Dams	X Fall	T	P	ECTS
		... Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Assist. Prof. Mustafa ONÜÇYILDIZ	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	4	30
	Project		
	Midterm Exam		
	Final Exam	1	70

<b>Course Objectives and Goals</b>	Providing planning stages, site establishment and design methods for dams and other large water resources facilities.
<b>Course Content</b>	1- Introduction, 2- Planning Principles of Dams, 3- Environmental Effect of Dams, 4- Hydrology for Dams, 5- Reservoir Sedimentation, 6- Reservoirs, 7- Derivation, 8- Dam Models, 9- Geological Assesment, 10- Dam Foundations, 11- Embankment Dams, 12- Concrete Dams, 13- Spillways and Gates Outlet, 14- Works.
<b>Course Learning Outcomes</b>	1- Knowledge of the dam and its components 2- Knowledge of the path to be followed in planning studies 3- Knowledge of the standards and regulations that must be followed in planning studies 4- Knowledge of what needs to be done for the sustainability of dams

**Recommended Resources**

- Herzag, M. A. M., Practical Dam Analysis, Thomas Telford Publishing, 1999.
- Mays, L. W., Water Resources Engineering, John Wiley and Sons, 2001.
- Novak, P., Moffat, A.I.B., Nalluri, C., Narayanan, R., Hydraulic Structures, E. and FN Spon, 1996.
- U.S.B.R., Design of Small Dams, U. S. Bureau of Reclamation, 1987.
- Ağırliođlu, N., Barajların Planlama ve Tasarımı, 2007.



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Hydraulic</b>

M. Sc. ...		Semester (X)	Credit		
Course Code	Course Name		T	P	ECTS
8222031004	Statistical Methods in Hydrology	... Fall X Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof. Dr. Meral BÜYÜKYILDIZ	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	15	50
	Project	1	50
	Midterm Exam		
	Final Exam		

<b>Course Objectives and Goals</b>	To provide basic knowledge and skills regarding the use of probability theory and statistical methods in hydrological studies
<b>Course Content</b>	1- Introduction 2- The importance of hydrological processes and statistical methods in hydrology 3- Probability distribution functions 4- Probability distribution functions 5- Probability distribution functions 6- Flood frequency analysis 7- Sample distributions and statistical hypotheses 8- Sample distributions and statistical hypotheses 9- Sample distributions and statistical hypotheses 10- Correlation and regression 11- Correlation and regression 12- Analysis of hydrological time series 13- Analysis of hydrological time series 14- Analysis of hydrological time series 15- Analysis of hydrological time series
<b>Course Learning Outcomes</b>	1- Learn the definition, importance, basic concepts, and applications of statistical methods in hydrology 2- Learn probability distributions and their applications in hydrology 3- Learn time series analysis in hydrology

**Recommended Resources**

1. Bayazit, M., (1981). Hidrolojide İstatistik Yöntemler, İ.T.Ü.İnşaat Fakültesi.
2. Şen, Z. (2002). İstatistik veri işleme yöntemleri, Su Vakfı Yayını, İstanbul.
3. Bayazit, M., (2013). Hidroloji, Birsen Yayınları, İstanbul.
4. Bayazit, M., Avcı, İ., Şen, Z., (2001). Hidroloji Uygulamaları, Birsen Yayınevi, İstanbul.
5. Usul, N. (2008). Mühendislik Hidrolojisi, ODTÜ Yayıncılık.
6. Bayazit, M.,(1996). İnşaat Mühendisliğinde Olasılık Yöntemleri, İ.T.Ü. İnşaat Fakültesi.
7. Bayazit, M., (2006). Çok Değişkenli İstatistik Analiz ve Hidrolojide Uygulamaları. Su Vakfı Yayınları.
8. Ders notları (pdf veya ppt).



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**Graduate Course Information Form**

<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Hydraulic</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222031008	Design and Operation of Storage Reservoirs	... Fall	T	P	ECTS
		X Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
Assist. Prof. Mustafa ONÜÇYILDIZ	X Turkish ... English	Must	Elective	Face to face	Online
			X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	4	30
	Project		
	Midterm Exam		
	Final Exam	1	70

<b>Course Objectives and Goals</b>	It is aimed to introduce the methods used in determining the capacity of the accumulation tanks and their optimal operation.
<b>Course Content</b>	1- Basic Concepts. Natural Stream Yield. Critical Dry Period 2- Reservoir Design by Empirical Methods. Range Analysis. Deficit Analysis 3- Stochastic Reservoir Theory. Reservoir Design by Simulation 4- Design of multireservoir Systems 5- Dead Storage. Flood Control Capacity. Spillway Capacity 6- General Operation Concepts 7- Standard Operating Rule 8- Rule Curves 9- Linear Programming 10- Chance Constrained Models 11- Dynamic Programming 12- Simulation of Reservoir Operation.. 13- Flood Control 14- Operation of Reservoir Systems
<b>Course Learning Outcomes</b>	1- Information will be gained about the design of a collection tank. 2- Information will be gained about the components of a collection tank. 3- Information will be gained about sustainable tank operation. 4- Information will be gained about long-term operation, programming, and simulation studies.

**Recommended Resources**

- Bayazit M., Biriktirme Haznelerinin Tasarımı ve İşletilmesi, İ.T.Ü., 1997.
- Kottegoda N. T., Stochastic Water Resources Technology, Wiley, 1979.
- Linsley R. K., Franzini J. B., Water-Resources Engineering, Mc Graw-Hill, 1979.
- Loucks D. P., Stedinger J. D., Haith D. A., Water Resource Systems Planning and Analysis, Prentice-Hall, 1981.



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Hydraulic</b>

M. Sc. ...					
Course Code	Course Name	Semester (X)	Credit		
8222031009	Stochastic Models in Hydrology	X Fall ... Spring	T 3	P 0	ECTS 5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof. Dr. Meral BÜYÜKYILDIZ	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	13	50
	Project	1	50
	Midterm Exam		
	Final Exam		

<b>Course Objectives and Goals</b>	Stochastic models applied to hydrological time series
<b>Course Content</b>	<ol style="list-style-type: none"> <li>1. Introduction and climate</li> <li>2. Hydrologic Stochastic Approach and time series</li> <li>3. Characteristic of hydrologic time series.</li> <li>4. Annual and periodic time series</li> <li>5. Stochastic modelling of time series</li> <li>6. Theoretical principles of stochastic modelling</li> <li>7. Theoretical principles of stochastic modelling</li> <li>8. Stochastic processes and time series</li> <li>9. Autoregressive Models (AR)</li> <li>10. Periodic Autoregressive Models (AR)</li> <li>11. Methodological of PAR models with stable parameters</li> <li>12. Autoregressive Moving Average Models (ARMA)</li> <li>13. Principles of ARMA Models</li> <li>14. Methodological of PARMA models with stable parameters</li> <li>14. Synthetic generation of hydrological series</li> <li>15. Principles of PARMA Models</li> </ol>
<b>Course Learning Outcomes</b>	<ol style="list-style-type: none"> <li>1. The ability to understand the aim and structure of stochastic hydrology</li> <li>2. The ability to produce synthetic series of hydrological variables</li> <li>3. The ability to establish the appropriate mathematical models representing the structure of stochastic processes</li> <li>4. The ability to use appropriate methods to measure the inner dependency of stochastic processes</li> </ol>

**Recommended Resources**

- 1- Salas, J. D., Delleur, J. W., Yevjevich, V. and Lane, W. L., Applied Modelling of Hydrologic Time Series, Water Resources Publication, 483 pp., 1980.
- 2- Lecture Notes (pdf or ppt)



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Institute	Graduate Education Institute
Department	Civil Engineering
Division/Program	Hydraulic

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222031010	Work and Worker Security at Construction	X Fall	T	P	ECTS
		... Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Assist. Prof. Mustafa ONUÇYILDIZ	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	5	40
	Project		
	Midterm Exam		
	Final Exam	1	60

<b>Course Objectives and Goals</b>	To raise awareness of Occupational Health and Safety in students. To provide information on how to develop a safety culture and implement it into working life.
<b>Course Content</b>	1- Security concept and importance 2- Advancement in security 3- Basic security 4- Security program (role, responsibility, communication, education, participation) 5- Legal coordination and control (situation in Türkiye) 6- Legal coordination and control (related law in Europa Union) 7- Work accident at construction 8- Engineers mission, authorization and responsibility 9- Enable to work security at construction 10- Taking security expedience for circurevention to work accident at construction 11- Taking security expedience for circurevention to work accident at construction 12- Personal protector hardwares and using methods 13- Minimum security and medical materials that have to been at costruction 14- Minimum healt and security condition forconstruction area
<b>Course Learning Outcomes</b>	1- You will learn about working life and healthy and safe working practices. 2- You will learn about the responsibilities and responsibilities in working life. 3- You will learn about the construction industry, workplace accidents, and health problems.

	4- You will learn about what needs to be done for safe working in construction.
<b>Recommended Resources</b>	<ul style="list-style-type: none"><li>- YELEKÇİ, Memduh, 2006, “İşçi Sağlığı- İş Güvenliği, İş Emniyeti” Seçkin Dağıtım</li><li>- DEMİRBİLEK, Tunç, 2005, “İş Güvenliği Kültürü” Legal Yayınları</li><li>-İSG Kanunu ve ilgili Yönetmelikler</li></ul>



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Hydraulic</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222031011	Risk Management at Construction	Fall	T	P	ECTS
		X Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Assist. Prof. Mustafa ONÜÇYILDIZ	X Turkish ... English				
			X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	5	40
	Project		
	Midterm Exam		
	Final Exam	1	60

<b>Course Objectives and Goals</b>	Learning what needs to be done to manage the concepts of Hazard and Risk and their application in the construction industry.
<b>Course Content</b>	<ul style="list-style-type: none"> <li>1- Risk management (general looking, philosophy)</li> <li>2- Risk management (basic concepts)</li> <li>3- Technical risk management</li> <li>4- Risk management process at construction</li> <li>5- Risk management techniques and agents at construction</li> <li>6- Risk planning at construction</li> <li>7- Risk evaluating at construction</li> <li>8- Risk reducing and watching at construction</li> <li>9- Risk management at process of construction contract</li> <li>10- Risk management at process of construction contract</li> <li>11- Risk management at process of building construction (quality, strategy)</li> <li>12- Risk management at process of building construction (configuration management)</li> <li>13- Risk analyses at construction</li> <li>14- Risk analyses at construction</li> </ul>
<b>Course Learning Outcomes</b>	<ul style="list-style-type: none"> <li>1- You will learn about the concepts of hazard and risk and their management.</li> <li>2- You will learn about the risks encountered in the construction industry.</li> <li>3- You will learn about risk management in the construction industry.</li> <li>4- You will learn about risk analysis and reporting.</li> </ul>

**Recommended Resources**

- ÖZKILIÇ, Özlem, 2005, "Risk Değerlendirme Metodolojileri" TISK Yayınları
- FİKİRKOCA, Meryem, 2003, "Bütünsel Risk Yönetimi" KALDER Yayınları



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**Graduate Course Information Form**

<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Hydraulics</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222031019	Advanced Hydrology	X Fall ... Spring	T 3	P 0	ECTS 5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Doç. Dr. Alpaslan YARAR	X Turkish X English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project		
	Midterm Exam	1	%40
	Final Exam	1	%60

<b>Course Objectives and Goals</b>	<b>It will be explained how much of the rainfall can be transferred to the stream and the effect of the hydrograph created by this stream on water resources facilities.</b>
<b>Course Content</b>	<ul style="list-style-type: none"> <li>1- Hydrology, Hydrological Cycle</li> <li>2- Precipitation and Evaluation of Precipitation Observations</li> <li>3- Precipitation and Evaluation of Precipitation Observations</li> <li>4- Surface Runoff and Catchment Characteristics</li> <li>5- Hydrometry, Hydrometric Observations and Evaluation</li> <li>6- Flow Components</li> <li>7- Hydrograph Analysis</li> <li>8- Separation of Hydrographs into Components</li> <li>9- Unit Hydrographs</li> <li>10- Unit Hydrographs</li> <li>11- Unit Hydrographs with Different Durations</li> <li>12- Applications</li> <li>13- Applications</li> <li>14- Applications</li> </ul>
<b>Course Learning Outcomes</b>	<ul style="list-style-type: none"> <li>1. They learn the skills to identify and analyze the application areas of hydrology, and to design, develop, and implement projects appropriate to the relevant field and problem. They also possess knowledge of reactivity.</li> <li>2. They learn the universal and societal impacts of hydrological applications and the need to understand contemporary problems.</li> <li>3. They learn to use theoretical and applied knowledge in mathematics, science, and basic engineering to solve hydrological</li> </ul>

	problems.
<b>Recommended Resources</b>	<ul style="list-style-type: none"><li>- Bayazit M., Hidroloji, İ.T.Ü., 1973. (Book)</li><li>- Mühendislik Hidrolojisi, ODTU, 2017, (Book)</li><li>- Lecture Notes (pdf or ppt)</li></ul>



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Hydraulic</b>

M. Sc. (X)		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222031020	Water Transmission and Distribution Systems	... Fall	T	P	ECTS
		(X) Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Assoc. Prof. Dr. Volkan YILMAZ	(X) Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project		
	Midterm Exam		
	Final Exam	1	100

<b>Course Objectives and Goals</b>	This course is designed to introduce students to urban water transmission and distribution systems. It is aimed that the students taking the course will have knowledge about the theoretical background and applications of the studies carried out in this field by the end of the semester and be brought to a level where they can make judgments in this field.
<b>Course Content</b>	1-Course information. 2-Introduction of water transmission and distribution systems. 3-Use of water and factors affecting water consumption. 4-Introducing pipe technologies used in water transmission and distribution systems. 5-Introducing transmission lines and examining design criteria. 6-Introducing water distribution networks and examining design criteria. 7-Operation of water transmission and distribution systems. 8-Investigation of water losses and leaks. 9-Investigation of water losses and leaks. 10-Investigation of water losses and leaks. 11-Urban infrastructure security. 12-Review of application examples. 13-Review of application examples. 14-Review of application examples. 15-Final Exam.
<b>Course Learning Outcomes</b>	1. Water transmission and distribution systems are introduced and design criteria are examined. 2. Construction and operation phases of water transmission and distribution systems are examined. 3. Water losses and leaks occurring in water transmission and

	distribution systems are examined. 4. Information is given about current developments in the world in the field of water transmission and distribution systems. 5. Examinations and evaluations are made about the applications in this field in our country.
<b>Recommended Resources</b>	Lecture Notes



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<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Hydraulic</b>

M. Sc. (X)		Ph.D. ...		
Course Code	Course Name	Semester (X)	Credit	
8222031021	Design of Drainage Systems	(X) Fall ... Spring	T 3	P 0 ECTS 5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Assoc. Prof. Dr. Volkan YILMAZ	(X) Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project		
	Midterm Exam		
	Final Exam	1	100

<b>Course Objectives and Goals</b>	This course is designed to provide students with the knowledge and skills necessary to remove excess water from agricultural and urban areas. The aim of the studies carried out during the semester is to bring students to a level where they can reason in this field.
<b>Course Content</b>	1-Course information. 2-Introduction to drainage systems and history of drainage. 3-Open Drainage Systems. 4-Deep Drainage Systems. 5-Design Principles of Drainage Systems. 6-Capacity Determination of Drainage Channels. 7-Urban Drainage Systems. 8-Design Principles of Urban Drainage Systems. 9-Wastewater Channel Dimensioning. 10-Wastewater Channel Dimensioning. 11-Review of application examples. 12-Review of application examples. 13-Review of application examples. 14-Review of application examples. 15-Final Exam.
<b>Course Learning Outcomes</b>	1. Gain knowledge and skills about the purposes of use of drainage systems. 2. Investigations are made about the source of excess water in agricultural and urban areas. 3. Theoretical principles and criteria used in the design of drainage systems are introduced. 4. The benefits of drainage systems are examined. 5. Examinations and evaluations are made about drainage practices in our country.





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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Hydraulic</b>

M. Sc. (X)		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222031022	Surface and Subsurface Processes in Hydrology	(X) Fall	T	P	ECTS
		... Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Assoc. Prof. Dr. Cihangir KÖYCEĞİZ	(X) Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	1	50
	Project	1	50
	Midterm Exam		
	Final Exam		

<b>Course Objectives and Goals</b>	<p>This course aims to teach students how the surface and subsurface processes included in the hydrologic cycle (evapotranspiration, soil moisture, groundwater) are physically simulated in hydrological models.</p> <p>Course objectives;</p> <ul style="list-style-type: none"><li>-To examine evapotranspiration processes</li><li>-To examine how soil moisture and groundwater storage systems in the hydrological cycle are modeled</li><li>-Introducing the basic principles of subsurface water movement in hydrological models</li></ul>
<b>Course Content</b>	<ol style="list-style-type: none"><li>1- Introduction to the hydrological cycle, the importance of evapotranspiration in the hydrological cycle, and related fundamental concepts</li><li>2- To examine the processes of evaporation and heat exchange, and to investigate the classification of evapotranspiration processes</li><li>3- To examine free water and lake evaporation processes, and to introduce modeling and measurement methods</li><li>4- To examine bare soil evaporation processes</li><li>5- To examine transpiration processes, measurement methods, and modeling principles</li><li>6- To examine the quantity of interception and interception loss, to investigate the importance of interception in the hydrological cycle,</li></ol>

	<p>and to introduce modeling principles and measurement methods</p> <p>7- To examine the concepts of potential, actual, and reference evapotranspiration, introduce calculation methods, and comparatively analyze their theoretical background</p> <p>8- To examine material properties in porous media, to investigate water storage processes, and to introduce related concepts</p> <p>9- Assignment</p> <p>10- To examine the fundamental principles of saturated subsurface flow (Darcy's Law, permeability, and hydraulic conductivity)</p> <p>11- To examine the fundamental principles of unsaturated subsurface flow (concepts related to surface tension, capillarity, etc.)</p> <p>12- To investigate infiltration processes and the vertical movement of water within the soil</p> <p>13- Introducing infiltration measurement methods</p> <p>14- To examine the principles of modeling infiltration processes (Richards Equations and Green-and-Ampt Model)</p> <p>15- To examine groundwater in the hydrological cycle and introduce modeling methods</p> <p>16- Project</p>
<p><b>Course Learning Outcomes</b></p>	<p>1- To be able to define the basic concepts related to evapotranspiration, soil moisture, and groundwater processes, which are important components of the hydrological cycle</p> <p>2- To be able to explain the relationship between surface and subsurface processes in hydrology</p> <p>3- To be able to calculate the parameters of free water evaporation, transpiration, potential evapotranspiration, actual evapotranspiration, and reference evapotranspiration</p> <p>4- To be able to model the intercepted water</p> <p>5- To be able to perform evapotranspiration- based water budget component analysis</p> <p>6- To be able to measure pan evaporation and infiltration</p> <p>7- To be able to formulate evapotranspiration and soil moisture parameters according to local specifications</p>
<p><b>Recommended Resources</b></p>	<p>1- Physical Hydrology, S. Lawrence Dingman</p> <p>2- The SAGE handbook of remote sensing, Timothy A Warner, M Duane Nellis, Giles M Foody</p> <p>3- Hidrolojik modeller, Mehmetçik Bayazıt</p> <p>4- Course notes</p>



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<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	

M. Sc. X		Ph.D. .			
Course Code	Course Name	Semester (X)	Credit		
8222011061	Scientific Research Methods and Experimental Design in Civil Engineering	X Fall .... Spring	T	P	ECTS
			3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof. Dr. Ülkü Sultan KESKİN	X Turkish ... English	X		X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project		
	Midterm Exam		
	Final Exam	1	100

<b>Course Objectives and Goals</b>	<p>The aim of the course is to examine the stages involved in the scientific research process (problem identification, data collection, data analysis, and interpretation of results), review key scientific research methods (experimental methods, theoretical methods, etc.), and to enable students to identify a research topic and conduct research on a specific topic by teaching them the techniques of finding a research question, forming a hypothesis, conceptualizing, measuring, collecting data, analyzing data, evaluating/interpreting data, and writing reports. This course will emphasize the concept of ethics and ethical theories, research ethics and publication ethics, and what constitutes unethical behavior. It aims to provide information and awareness about the most common research and publication ethics violations, methods to prevent them, and the steps to follow if a violation is detected.</p>
<b>Course Content</b>	<ol style="list-style-type: none"><li>1- Scientific research and scientific research processes</li><li>2- Scientific research methods (Qualitative Research), Scientific research methods (Quantitative Research)</li><li>3- Data collection processes and analysis methods, Concepts of validity and reliability</li><li>4- Steps followed to determine the research problem and hypotheses</li><li>5- Essential characteristics of a scientific study</li><li>6- Points to consider when writing scientific studies</li><li>7- Institutions and organizations that provide financial support for scientific studies, preparation of scientific research</li></ol>

	<p>projects</p> <p>8- The concept of ethics and profession</p> <p>9- Ethical theories</p> <p>10- The concept of research ethics and its basic principles</p> <p>11- Unethical behavior and ethical violations in the research process</p> <p>12- Publication ethics and its basic principles</p> <p>13- Unethical behavior and ethical violations in the publication process</p> <p>14- Evaluation and discussion of legal regulations related to research and publication ethics</p>
<b>Course Learning Outcomes</b>	<p>Transfers scientific research techniques.</p> <p>Understands and analyzes the ethical aspects of science and technology-related topics.</p> <p>Can design a scientific research project and present it in a report in accordance with ethical rules.</p>
<b>Recommended Resources</b>	<p>Research Articles, Theses, and Final Theses Scientific Research Methods (Şener Büyüköztürk), Scientific Research Method (Niyazi Karasar)</p>



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Transportation</b>

M. Sc. X		Ph.D. ...				
Course Code	Course Name	Semester (X)		Credit		
8222051009	Specific Problems in Bituminous Hot Mixtures	X	Fall	T	P	ECTS
		...	Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Assist. Prof. Dr. Deniz Arslan	X Turkish X English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	4	8
	Project		
	Midterm Exam	1	32
	Final Exam	1	60

<b>Course Objectives and Goals</b>	Teaching properties and calculation methods of bituminous hot mixtures, investigation of bituminous hot mixtures distresses on the basis of cause-result.
<b>Course Content</b>	1-Properties of bituminous hot mixtures 2-Calculation of bituminous hot mixtures 3-Determination of pre-optimum bitumen content 4-Asphalt Institute method 5-Surface area method 6-French method 7-TEM method 8-Determination of optimum bitumen content 9-Stability 10-Flow 11-Distresses on bituminous hot mixtures 12-Deformations 13-Decompositions 14-Crackings
<b>Course Learning Outcomes</b>	1. Learns properties of bituminous hot mixtures 2. Calculates mechanical properties of bituminous hot mixtures 3. Designs bituminous hot mixtures 4. Understands distresses of bituminous hot mixtures
<b>Recommended Resources</b>	1. Highway Engineering _ Pavements, Materials and Control of Quality- CRC Press (2014) Nikolaidis, Athanassios 2. Yol Malzemeleri ve Uygulamaları (2001) Argun Tunç 3. NCHRP Report 673. A Manual for Design of Hot Mix Asphalt with Commentary. Transportation Research Board. 4. Lecture Notes



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Transportation</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222051010	Practical applications in highway engineering	... Fall	T	P	ECTS
		X Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Assist. Prof. Dr. Deniz Arslan	X Turkish X English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	4	16
	Project		
	Midterm Exam	1	24
	Final Exam	1	60

<b>Course Objectives and Goals</b>	Teaching highway pavement properties and designing them on application basis
<b>Course Content</b>	<ol style="list-style-type: none"><li>1. An overview of highway pavement types</li><li>2. Factors affecting pavement performance</li><li>3. Types of low standard flexible pavements</li><li>4. Penetration McAdam base</li><li>5. Bituminous McAdam base</li><li>6. McAdam base with water</li><li>7. Surface coatings</li><li>8. Low standard flexible pavement design</li><li>9. Properties of high standard flexible pavements</li><li>10. High standard flexible pavement design based on progressive construction</li><li>11. Performance period concept</li><li>12. Analysis period concept</li><li>13. Environmental effects (swelling and frost heave) on maximum performance period</li><li>14. Designing high standard flexible pavement by reduced performance period</li></ol>
<b>Course Learning Outcomes</b>	<ol style="list-style-type: none"><li>1. Knows the types of highway pavements.</li><li>2. Designs flexible highway pavements.</li><li>3. Applies staged construction technique for high-standard flexible pavements.</li><li>4. Incorporates environmental factors into highway pavement design.</li></ol>
<b>Recommended Resources</b>	<ol style="list-style-type: none"><li>1. AASHTO Guide for Design of Pavement Structures 1993</li><li>2. Esnek Üstyapılar Projelendirme Rehberi, KGM, 2008</li></ol>



REPUBLIC OF TURKEY  
KONYA TECHNICAL UNIVERSITY  
**Graduate Course Information Form**

<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Mechanics</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011062	Experimental Analysis of Structures	X Fall ... Spring	T 3	P 0	ECTS 5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
Assoc. Prof. Dr. Alptuğ ÜNAL	X Turkish ... English	Must	Elective	Face to face	Online
			<b>X</b>	<b>X</b>	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project		
	Midterm Exam		
	Final Exam	<b>1</b>	<b>100</b>

<b>Course Objectives and Goals</b>	To learn the planning and application of the experimental work in the building, To learn the measuring instruments and systems used in the experimental works and to learn the interpretation and evaluation of the obtained experimental results
<b>Course Content</b>	1- Introduction, investigation of experimental works 2- Introduction of measuring instruments 3- Experiment types, experimental quantities 4- Mechanical measuring instruments and application techniques 5- Experimental studies in the field 6- Experimental studies in the field 7- Experimental studies in laboratory 8- Experimental studies in laboratory 9- Experiments conducted in reinforced concrete structures 10- Experiments conducted in masonry structures 11- Experiments conducted in steel structures 12- Experiments conducted in wooden structures 13- Evaluation of test results 14- Evaluation of test results
<b>Course Learning Outcomes</b>	It determines what types of experiments need to be conducted to determine structural behavior. It determines how the devices to be used in experimental studies will be placed on the test elements and how measurements will be taken. It evaluates the experimental results by analyzing them.
<b>Recommended Resources</b>	Dally, J.W. and Riley W. F., Experimental Stress Analysis, Mc Graw-Hill, New York, 1991. Bungey, J. H., The Testing of Concrete in Structures, Taylor and Francis, 2006.





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KONYA TECHNICAL UNIVERSITY  
Graduate Course Information Form

<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Mechanics</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222021002	Engineering Seismology	X Fall	T	P	ECTS
		... Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof. Dr. Mehmet KAMANLI	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project	1	%30
	Midterm Exam		
	Final Exam	1	%70

<b>Course Objectives and Goals</b>	This course aims to teach students and researchers about the occurrence of earthquakes, earthquake waves, vibration and earthquake codes.
<b>Course Content</b>	1,2,3,4,5,6,7,8,9- Earthquake event, properties and causes of occurrence, earthquake waves, wave equation and its solution, reflection and refraction of earthquake waves in the earth, intensity, magnitude, energy table, earthquake belts, seismicity and earthquake zones, some major earthquakes, recording of earthquake motion seismographs 11- seismographs 12- vibration of single-order systems 13- earthquake regulations. 14- earthquake regulations.
<b>Course Learning Outcomes</b>	1 Explains the effects of earthquake on land, structure and huma 2 Identifies earthquake hazard and risk 3 Explains and calculates concepts such as spectrum, ground magnification 4 Explains the relationships between magnitude, acceleration-PGA, earthquake duration
<b>Recommended Resources</b>	Lecture Notes, Prof. Dr. Zekai Celep, Prof. Dr. Nahit Kumbasar Deprem Müh.Giriş



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**Graduate Course Information Form**

<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Mechanics</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222021006	Experimental Mechanics	... Fall	T	P	ECTS
		X Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof. Dr. Mehmet KAMANLI	X Turkish				
	... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project	1	%30
	Midterm Exam		
	Final Exam	1	%70

<b>Course Objectives and Goals</b>	This course aims to teach students and researchers the fundamentals of mechanics and the experimental methods used in elasticity.
<b>Course Content</b>	<ul style="list-style-type: none"> <li>1- Basic Topics of Elasticity, Lights</li> <li>2- Polarized Light</li> <li>3- Light in Anisotropic Medium</li> <li>4- Optics of Polariscop</li> <li>5- Law of Photoelasticity</li> <li>6- Separation Methods</li> <li>7- Material Characteristics</li> <li>8- Mechanics Experiments</li> <li>9- Mechanics Experiments</li> <li>10- Mechanics Experiments</li> <li>11- Mechanics Experiments</li> <li>12- Mechanics Experiments</li> <li>13- Mechanics Experiments</li> <li>14- Mechanics Experiments</li> </ul>
<b>Course Learning Outcomes</b>	Researchers understand the fundamentals of mechanics and the experimental methods used in elasticity.
<b>Recommended Resources</b>	Lecture Notes, Prof. Dr. Mustafa İNAN ,Elasticity Theory



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**Graduate Course Information Form**

<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Mechanics</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222021015	Structural Active and Passive Control Systems	X Fall ... Spring	T 3	P 0	ECTS 5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof. Dr. Mehmet KAMANLI	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project	1	%30
	Midterm Exam		
	Final Exam	1	%70

<b>Course Objectives and Goals</b>	The aim of this course is to introduce students to the principles, design approaches, and practical applications of active, passive, semi-active, and hybrid control systems used to enhance the seismic and wind performance of structures. Students will gain the ability to analyze dynamic responses, understand damping and isolation mechanisms, and develop innovative control solutions for modern engineering structures.
<b>Course Content</b>	<ol style="list-style-type: none"> <li>1- Introduction to Structural Control Systems and Basic Concepts</li> <li>2- Dynamic Loads and Structural Behavior</li> <li>3- Classification of Structural Control Systems</li> <li>4- Introduction to Passive Control Systems</li> <li>5- Passive Energy Dissipation Devices</li> <li>6- Base Isolation Systems and Application Examples</li> <li>7- Active Control Systems and Components</li> <li>8- Midterm Examination</li> <li>9- Semi-Active Control Systems</li> <li>10- Hybrid (Combined) Control Systems</li> <li>11- Case Study: Taipei 101 and Tuned Mass Dampers</li> <li>12- Structural Control Applications and Regulations in Turkey</li> <li>13- Local Production, Standards, and Research &amp; Development</li> <li>14- Final Project Presentations</li> </ol>

<p><b>Course Learning Outcomes</b></p>	<p>Explain the concept and historical development of structural control systems.</p> <p>Analyze the effects of dynamic loads (earthquakes, wind, etc.) on structural behavior.</p> <p>Identify and describe the main types of passive control systems such as base isolation and tuned mass dampers.</p> <p>Evaluate the working principles and energy requirements of active control systems.</p> <p>Distinguish between semi-active and hybrid systems and their respective advantages.</p> <p>Examine real-world applications of control systems and assess their performance.</p> <p>Interpret and discuss relevant national and international codes and standards.</p> <p>Propose design concepts for innovative and locally developed control systems.</p>
<p><b>Recommended Resources</b></p>	<p><b>Soong, T. T. &amp; Dargush, G. F. (1997).</b> <i>Passive Energy Dissipation Systems in Structural Engineering</i>. John Wiley &amp; Sons.</p> <p><b>Spencer, B. F., &amp; Nagarajaiah, S. (2003).</b> “State of the Art of Structural Control.” <i>Journal of Structural Engineering</i>, ASCE.</p> <p><b>Chopra, A. K. (2020).</b> <i>Dynamics of Structures: Theory and Applications to Earthquake Engineering</i>. Pearson.</p> <p><b>Preumont, A. (2011).</b> <i>Vibration Control of Active Structures: An Introduction</i>. Springer.</p> <p><b>Kamanlı, M. (2024).</b> <i>Yapılarda Aktif ve Pasif Kontrol Sistemleri</i>. (Sunum notları ve ders materyalleri).</p> <p><b>Naeim, F. &amp; Kelly, J. M. (1999).</b> <i>Design of Seismic Isolated Structures: From Theory to Practice</i>. John Wiley &amp; Sons.</p>



REPUBLIC OF TURKEY  
KONYA TECHNICAL UNIVERSITY  
INSTITUTE OF GRADUATE STUDIES  
**Course Datasheet**

<b>Institute</b>	<b>Institute of Graduate Studies</b>
<b>Department</b>	<b>Department of Civil Engineering</b>
<b>Program</b>	<b>MECHANICAL</b>

Program Type	Course Name	Semester	Credits		
<input checked="" type="checkbox"/> Master <input type="checkbox"/> Doctorate	EARTHQUAKE ENGINEERING BASIC PRINCIPLES FOR BUILDINGS	<input type="checkbox"/> Autumn <input checked="" type="checkbox"/> Spring	T	L	ECTS
			3	0	7,5

Instructor	Language	Course Status (X)	
M. Sami DÖNDÜREN, Prof.Dr.	<input checked="" type="checkbox"/> Turkish <input checked="" type="checkbox"/> English <input type="checkbox"/> Other.....	Required	Elective
			X

Methods of Assessment			
	Exams and Assessment Methods	Number	Percentage (%)
	Laboratory		
	Oral exam		
	Homework + Oral exam	1	%30
	Project + Oral exam		
	Written exam	1	%70
	Other (.....)		

<b>Course Objectives</b>	Teaching earthquake-resistant building design rules
<b>Course Content</b>	1-3. week. What is an earthquake? 4-5. week: Earthquake formation and its effect on the earth 6-7. week: Earthquake and structure 8-9. week: Earthquake force and structure-soil interaction 10-11. week: Effect of earthquake force on structures 12-14. week: Earthquake energy and its consumption in the structure
<b>Course Outcomes</b>	1. Learn how earthquakes occur and general definitions of waves and earthquakes. 2. Learns the calculation of earthquake force and its effect on the structure. 3. Learns earthquake-resistant building design rules.
<b>Teaching Methods</b>	Theoric

<b>Books &amp; Materials</b>	- Lecture Notes (pdf veya ppt)	
<b>Course Category by Content (%)</b>	<b>Mathematics and Basic Sciences</b>	% ....
	<b>Engineering Sciences</b>	% 80
	<b>Design</b>	% 20
	<b>Architectural Science</b>	% ....
	<b>Social and Management Sciences</b>	% ....

T: Theory    L: Laboratory    ECTS: European Credit Transfer System

<b>Name and Code of Course:</b>				
<b>Program Outcomes</b>		1	2	3
1	An ability to apply knowledge of mathematics, science and engineering			X
2	An ability to design and conduct experiments, as well as analyze and interpret data			X
3	An ability to design a system, component or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for and ability to engage in life-long learning			X
10	A knowledge of contemporary issues			X
11	An ability to use the techniques, skills and modern engineering tools necessary for engineering practice			X
<b>Course Outcomes:</b> 1: None 2: Partial 3: Completely				

Prepared by : **Prof. Dr. M. Sami DÖNDÜREN**

Date : 06/12/2023



REPUBLIC OF TURKEY  
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**Graduate Course Information Form**

<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Civil Engineering (Mechanic)</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
	Computer Aided Solution of Structural Mechanics Problems	... Fall X Spring	T	P	ECTS
			3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
Assoc. Prof. Dr. Ceyhun AKSOYLU	X Turkish ... English	Must	Elective	Face to face	Online
			X	X	X

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	1	30
	Project	1	70
	Midterm Exam		
	Final Exam		

<b>Course Objectives and Goals</b>	<p>To teach the modeling approach in civil engineering structures.</p> <p>To teach structural system design and load analysis.</p> <p>To teach the static and dynamic analysis of structures modeled in two or three dimensions.</p> <p>To teach special topics in structural mechanics, free vibration analysis, spectral analysis solutions and show their application areas.</p>
<b>Course Content</b>	<ol style="list-style-type: none"> <li>1- Analysis of Isostatic Frames (I)</li> <li>2- Analysis of Isostatic Frames (II)</li> <li>3- Analysis of Three-Hinged Frames</li> <li>4- Analysis of Statically Indeterminate Frames (I)</li> <li>5- Analysis of Statically Indeterminate Frames (II)</li> <li>6- Support Settlement and Temperature Effects</li> <li>7- Analysis and Design of Continuous Beams under Adverse Loading Conditions</li> <li>8- P-Delta Analysis</li> <li>9- Buckling Analysis</li> <li>10- Planar Multi-Story Frame Analysis under Equivalent Seismic Loads</li> <li>11- Three-Dimensional Multi-Story Building Analysis under Equivalent Seismic Loads</li> <li>12- Three-Dimensional Multi-Story Building Analysis using the Modal Response Spectrum Method (I)</li> <li>13- Three-Dimensional Multi-Story Building Analysis using the Modal Response Spectrum Method (II)</li> <li>14- Nonlinear Static (Pushover) Analysis</li> </ol>

<b>Course Learning Outcomes</b>	To teach structural system design and load analyses. To provide instruction on the static and dynamic analyses of reinforced concrete and steel structures modeled in two and three dimensions.
<b>Recommended Resources</b>	Örneklerle Sap 2000 V.20, Prof.Dr.Günay ÖZMEN, Doç.Dr.Engin ORAKDÖĞEN, Doç.Dr.Kutlu DARILMAZ, Birsen Yayınevi, 2018. Computational Structural Mechanics, Sankara SUBRAMANIAN, Prentice Hall, 2009. İnşaat Mühendisliğinde Sap2000 Uygulamaları, Ahmet Can Altunışık, Şevket Ateş, Süleyman Adanur, Nobel Akademik Yayıncılık, 2018. Örneklerle ETABS 2013, Günay Özmen, Engin Orakdöğen, Kutlu Darılmaz, Birsen Yayınevi, 2014.



REPUBLIC OF TURKEY  
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Graduate Course Information Form

<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Transportation</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222051001	FUNDAMENTAL PRINCIPLES OF TRANSPORT ECONOMICS	X Fall	T	P	ECTS
		... Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof. Dr. Osman Nuri ÇELİK	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project		
	Midterm Exam		
	Final Exam	1	100

<b>Course Objectives and Goals</b>	To give detailed information about transport economics and investments
<b>Course Content</b>	1-Transport sector, 2- Characteristics of transport management, 3- General economics, 4- Goods market, supply and demand, 5- Benefit theory, 6- Problems in transport economics, 7- Transport demand and traffic estimation, 8- Transport cost, pricing policies, 9- Evaluation of investment, 10- Inadequate transport affects, 11- Transport planning and stages, 12- Optimization problems in transport organization 13-Domestic income and employment, 14- Economy policies
<b>Course Learning Outcomes</b>	1) Explain the fundamental structure, functioning, and role of the transportation sector within the economic system. 2) Apply supply and demand equilibrium, price formation, and profit theory to the transportation sector. 3) Analyze the transportation cost structure and evaluate the impact of cost elements on efficiency. 4) Analyzes the stages of transportation planning and optimization problems in a solution-oriented manner.

	5) Interprets the relationship between the transportation sector and national income, employment, and general economic policies.
<b>Recommended Resources</b>	<ol style="list-style-type: none"><li>1. Fundemantal Principles of Transport Ekonomics, Prof. Dr. GÜngör Evren, Istanbul Tchnical university, (in Turkish).</li><li>2. 'Cost Accaunting in Transport Managements' Dr.Feryal Orhon</li><li>3. 'Introduction to Economy Theory - Microeconomics' Prof.Dr.Orhan Türkay, İmaj press, Ankara, (in Turkish).</li><li>4. 'Economics' Erdoğan Aklın, Filiz Press, İstanbul, (in Turkish).</li><li>5. 'Transport Economics', P.C. Stubbs, W.J. Tyson ve M.Q. Dalvi.</li><li>6. SCI index papers.</li></ol>



REPUBLIC OF TURKEY  
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**Graduate Course Information Form**

<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Transportation</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222051007	RAIL TRANSPORT SYSTEMS	... Fall	T	P	ECTS
		X Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
Prof. Dr. Osman Nuri ÇELİK	X Turkish ... English	Must	Elective	Face to face	Online
			X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project		
	Midterm Exam		
	Final Exam	1	100

<b>Course Objectives and Goals</b>	Providing information about rail transportation systems, design elements, and urban and interurban rail transit systems.
<b>Course Content</b>	<ol style="list-style-type: none"> <li>1- Historical development of railways,</li> <li>2- General characteristics of rail transport systems,</li> <li>3- Classification of rail transport systems,</li> <li>4- Advantages and disadvantages,</li> <li>5- Characteristics of railway car,</li> <li>6- Speed limits</li> <li>7- Route planning</li> <li>8- Curve radius</li> <li>9- Profile,</li> <li>10- Switch and crossings,</li> <li>11- Applications</li> <li>12- Construction</li> <li>13- Management</li> <li>14- Maintenance</li> </ol>
<b>Course Learning Outcomes</b>	<ol style="list-style-type: none"> <li>1) Explains the development and types of rail systems and evaluates their strengths and weaknesses.</li> <li>2) Defines the structural and operational characteristics of railway vehicles. Evaluates the factors affecting speed limits.</li> <li>3) Applies engineering principles in railway route planning, curve radius, and profile design.</li> <li>4) Analyzes switch systems and their function within track geometry and develops appropriate solution proposals for railway design applications.</li> </ol>

	5) Develops sustainable operation and maintenance strategies by evaluating processes related to railway construction, management, and maintenance.
<b>Recommended Resources</b>	<ol style="list-style-type: none"><li>1. 'Railway' , Prof. Dr. Güngör Evren, Birsen Press, (in Turkish).</li><li>2. 'Earthworks and Railway', Prof. Dr. İnal Seçkin, (in Turkish).</li><li>3. 'Railway rehabilitation and repair', Şehzat Günoral, Ulaşım AŞ, (in Turkish).</li><li>4. SCI index and international conference papers.</li></ol>



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Transportation</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222051008	AIRPORT DESIGN AND CONSTRUCTION	X Fall	T	P	ECTS
		... Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
Prof. Dr. Osman Nuri ÇELİK	X Turkish ... English	Must	Elective	Face to face	Online
			X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project		
	Midterm Exam		
	Final Exam	1	100

<b>Course Objectives and Goals</b>	To give detailed information about airport construction and applications.
<b>Course Content</b>	1- Airports, 2- Commercial administration conditions, 3- Airway transport types, 4- Aviation types, 5- Airport design, 6- Region election, 7- Port types, 8- Landing runway types, 9- Landing area design, 10- Construction management, 11- Taxiway planning, 12- Pavement design, 13- Management, 14- Maintenance.
<b>Course Learning Outcomes</b>	1) Explains the basic components of air transportation systems, the function of airports, and commercial operating conditions. 2) Explains the airport planning process and the basic principles of site selection and runway layout. 3) Defines airport superstructure types and performs thickness design. 4) Explains the basic principles of airport construction, operation, and maintenance processes.

**Recommended Resources**

1. 'Airport Construction handouts" , Prof. Faruk Umar, İTÜ.
2. 'Airport Pavement Design and Evaluation', FAA.
3. SCI index papers.



REPUBLIC OF TURKEY  
KONYA TECHNICAL UNIVERSITY  
Graduate Course Information Form

Institute	Graduate Education Institute
Department	Civil Engineering
Division/Program	Structure

M. Sc X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222001017	Structure Damage Types and Detection Methods	X Fall	T	P	ECTS
		... Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Assoc.Prof.Dr.Gamze DOĞAN	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	2	30
	Project		
	Midterm Exam		
	Final Exam	1	70

<b>Course Objectives and Goals</b>	<p>The aim of this course is to provide a comprehensive understanding of the identification of all types of structural and non-structural element damages that may occur in reinforced concrete and masonry structures due to various external actions, to introduce damage detection methods, and to present fundamental design principles necessary for preventing such damages. The ultimate goal of the course is to equip students with the technical knowledge and practical skills required to perform on-site damage assessment of structures following potential earthquake events.</p>
Course Content	<ol style="list-style-type: none"><li>1- Overview of damage sources in structures</li><li>2- Global structural damage mechanisms and related code information</li><li>3- Damage limits and preventive measures in TBDY-2018 (Turkish Seismic Code)</li><li>4- Damage limits and preventive measures in TS 500-2000 (Design and Construction of Reinforced Concrete Structures)</li><li>5- Types of structural and non-structural damages</li><li>6- Damage definitions in EC-8, FEMA-356, FEMA-440, and ATC-40</li><li>7- Estimation of existing capacity of damaged structures and structural elements, and recommendations for strengthening</li></ol>

	<p>calculations</p> <p>8- Damage types and mechanisms in reinforced concrete structures</p> <p>9- Damage types and mechanisms in masonry structures</p> <p>10- Principles of damage assessment according to the Post-Earthquake Building Damage Classification Code</p> <p>11- Global analysis examples and evaluation approaches for damaged buildings</p> <p>12- International practices and comparative approaches for damage assessment and classification</p>
<p><b>Course Learning Outcomes</b></p>	<p>Upon successful completion of the course, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Explain the causes of damage in structures and identify different sources of damage, as well as evaluate their effects on structural behavior.</li> <li>2. Understand global damage mechanisms and the fundamental approaches and classifications presented in relevant codes and analyze the relationship between damage and the overall structural behavior.</li> <li>3. Define the damage limits and preventive measures specified in TBDY-2018 (Turkish Seismic Code) and assess existing structures according to these criteria.</li> <li>4. Interpret the damage limits in TS 500-2000 (Design and Construction of Reinforced Concrete Structures), evaluate the safety of reinforced concrete elements, and develop preventive design approaches.</li> <li>5. Distinguish between structural and non-structural damage types and analyze their influence on overall structural performance.</li> <li>6. Examine and compare damage definitions in international codes such as EC-8, FEMA-356, FEMA-440, and ATC-40, and apply them in practical assessments.</li> <li>7. Estimate the existing load-carrying capacity of damaged structures and structural elements, and propose appropriate strengthening strategies.</li> <li>8. Identify the types and mechanisms of damage occurring in reinforced concrete structures, analyze their causes, and develop mitigation strategies.</li> <li>9. Explain the damage mechanisms observed in masonry structures and apply assessment methods specific to these types of structures.</li> <li>10. Apply the principles of damage detection and classification in accordance with the Post-Earthquake Building Damage Classification Code and perform on-site assessments.</li> <li>11. Analyze real-life examples of damaged buildings, perform global structural analyses, and evaluate their performance.</li> <li>12. Compare international approaches to damage detection and classification, identify best practices, and adapt them to local applications.</li> </ol>
<p><b>Recommended Resources</b></p>	<ul style="list-style-type: none"> <li>- <i>Post-Earthquake Building Damage Classification Code</i>, Ministry of Environment, Urbanization and Climate Change (2025), (in Turkish).</li> <li>- Turkish Standards Institution (2000). <i>TS 500: Design and Construction of Reinforced Concrete Structures</i> (in Turkish).</li> <li>- CEN (2004). <i>Eurocode 8: Design of Structures for Earthquake Resistance – Part 1: General Rules, Seismic Actions and Rules for Buildings</i>, European Standard EN 1998-1:2004, Comité Européen de Normalisation, Brussels,</li> </ul>

Belgium.

- ASCE (2000). *FEMA 356: Prestandard and Commentary for the Seismic Rehabilitation of Buildings*, American Society of Civil Engineers for the Federal Emergency Management Agency, Washington, D.C.
- FEMA (2005). *FEMA 440: Improvement of Nonlinear Static Seismic Analysis Procedures*, Federal Emergency Management Agency, Washington, D.C.
- Applied Technology Council (1996). *ATC 40: Seismic Evaluation and Retrofit of Reinforced Concrete Buildings*, Report ATC-40 / SSC 96-01, Palo Alto, CA.
- AFAD – Disaster and Emergency Management Authority (2018). *Turkish Building Earthquake Code (TBEC-2018)*, Ankara, Turkey (in Turkish).



REPUBLIC OF TURKEY  
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Graduate Course Information Form

<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Graduate education</b>

M. Sc. ...		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222001023	Performance-based analysis and design of reinforced concrete structures using ETABS based on the Finite Element Method (FEM)	X Fall ... Spring	T	P	ECTS
			3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Dr. Öğr. Üyesi Mustafa Koçer	X Turkish ... English		x	x	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	4	40
	Project	1	10
	Midterm Exam		
	Final Exam	1	50

<b>Course Objectives and Goals</b>	To teach the principles of displacement-based analysis and design, along with nonlinear building behavior.
<b>Course Content</b>	<ol style="list-style-type: none"><li>1. Introduction to Nonlinear Analysis of Structures</li><li>2. Seismic Demand in Reinforced Concrete Structures</li><li>3. Nonlinear Analysis Methods</li><li>4. Material Behaviors</li><li>5. Material Models</li><li>6. Moment–Curvature Relationship</li><li>7. Plastic Hinge Hypothesis (Distributed and Lumped)</li><li>8. Calculation of Building Capacity Curve Using Static Pushover Analysis</li><li>9. Performance-Based Design and Assessment</li><li>10. Current Codes for the Assessment and Strengthening of Existing Structures</li><li>11. Applications of the Turkish Seismic Code 2018 (TBDY 2018) for the Assessment and Strengthening of Existing Structures (Case Study)</li><li>12. Analysis Using Single-Mode Pushover Method</li><li>13. Analysis Using Multi-Mode Pushover Method</li><li>14. Determination of the Performance Point</li></ol>
<b>Course Learning Outcomes</b>	<ul style="list-style-type: none"><li>• To examine the nonlinear behavior of reinforced concrete structures To apply solution methods for nonlinear systems</li><li>• To teach the principles of performance-based design based on the Finite Element Method (FEM)</li></ul>
<b>Recommended Resources</b>	<ol style="list-style-type: none"><li>1. Celep, Z. Ve Kumbasar, N., Betonarme Taşıyıcı Sistemlerde Doğrusal Olmayan Davranış ve Çözümleme, Beta Dağıtım.</li><li>2. AZER ARASTUNOĞLU KASIMZADE, SEM TEMELİNDE YAPISAL TASARIM VE ANALİZ, NOBEL YAYINEVİ</li></ol>



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Structure</b>

M. Sc. ...		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011002	INDUSTRIAL STEEL STRUCTURES	Fall	T	P	ECTS
		Spring (X)	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof. Dr. Ali KÖKEN	Turkish (X) English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project	1	70
	Midterm Exam		
	Final Exam	1	30

<b>Course Objectives and Goals</b>	Within the scope of the course, high-rise steel structural systems, the elements that constitute the system, and their assembly will be addressed, and a sample project design and solutions will be carried out.
<b>Course Content</b>	<ol style="list-style-type: none"><li>1. Introduction</li><li>2. Mechanical properties of steel and joining methods</li><li>3. Relevant Regulations</li><li>4. Joints and Connections</li><li>5. Steel structural elements – Tension members</li><li>6. Steel structural elements – Compression members</li><li>7. Steel structural elements – Bending members</li><li>8. Steel structural elements – Shear effects</li><li>9. Demonstration of the solution method using SAP2000 Program</li><li>10. Demonstration of the solution method using SAP2000 Program</li><li>11. Example project data distribution</li><li>12. Example project solution</li><li>13. Example project solution</li><li>14. Example project solution</li></ol>
<b>Course Learning Outcomes</b>	Introduction of industrial steel structure systems, mastering their calculation and design
<b>Recommended Resources</b>	-Çelik Yapıların Hesap ve Yapım Esasları Yönetmeği ve Uygulama Kılavuzu -SAP2000 Bilgisayar Yazılımı



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	

M. Sc. ...		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011006	Earthquake Resistant Design of RC Structures	X Fall	T	P	ECTS
		...Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof. Dr. Murat Öztürk	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	1	40
	Project		
	Midterm Exam		
	Final Exam	1	60

<b>Course Objectives and Goals</b>	Understanding the principles of earthquake-resistant building design, the requirements of the Turkish Building Earthquake Code and the behavioral principles it aims to provide.
<b>Course Content</b>	<p>1-Earthquake, Formation of Earthquake, Seismic Waves</p> <p>2-Earthquake and effects on structures (Earthquake, Effect of soil Condition on Earthquake Motion, Soil Liquefaction)</p> <p>3- Spectrum concept, earthquake spectra, acceleration spectrum, design spectra.</p> <p>4-Earthquake Resistant Building Design (Basic Principles, Earthquake Resistant Building Concept, Strength, Ductility, Stiffness)</p> <p>5-General Principles and Rules Specified in the Earthquake Code (Spectrum Concept, Irregularities)</p> <p>6- General Principles and Rules Specified in the Earthquake Code (Reducing Elastic Earthquake Loads, Limiting Displacements, Second Order Effects and Earthquake Joints)</p> <p>7- Design Rules for Earthquake-Resistant Reinforced Concrete Buildings (Design Philosophy, Causes of Damage, Material Strengths, Plastic Hinge Concept)</p> <p>8- Design Rules for Earthquake-Resistant Reinforced Concrete Buildings (Capacity Design, Ductility and Stiffness in Columns, Beams and Shear Walls, Shear Wall-Frame Interaction, Stiffness and Strength of Shear Walls, Flexural and Shear Failure in Shear Walls)</p> <p>9-- Principles of earthquake resistant architectural design (Factors which effect architectural design for earthquakes, Suitability of structure in plan)</p> <p>10- Earthquake Resistant Design Rules for Reinforced Concrete</p>

	<p>Members (Conditions for High and Normal Ductility Level Columns, Beams and Shear Walls, Column-Beam Joint Zones in Frame Systems, Slabs</p> <p>11- Earthquake Resistant Design Rules for Reinforced Concrete Members (Conditions for High and Normal Ductility Level Columns, Beams and Shear Walls, Column-Beam Joint Zones in Frame Systems, Slabs</p> <p>12- Earthquake Resistant Design Rules for Reinforced Concrete Members (Conditions for High and Normal Ductility Level Columns, Beams and Shear Walls, Column-Beam Joint Zones in Frame Systems, Slabs</p> <p>13- Earthquake Resistant Design Rules for Foundations and Soils</p> <p>14- Seismic Isolators</p>
<b>Course Learning Outcomes</b>	<ol style="list-style-type: none"> <li>1. Understands the philosophy of earthquake-resistant building design.</li> <li>2. Understands the requirements of the Turkish Building Earthquake Code and the behavioral principles it aims to implement.</li> <li>3. Gains the ability to interpret analysis results through assignments.</li> </ol>
<b>Recommended Resources</b>	<ol style="list-style-type: none"> <li>1. Lecture notes</li> <li>2. Turkey Building Earthquake Code-2018</li> </ol>



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Structure</b>

M. Sc. (X)		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011012	STEEL SPACE SYSTEM STRUCTURES	Fall	T	P	ECTS
		Spring (X)	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof. Dr. Ali KÖKEN	Turkish (X) English				
			X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project	1	70
	Midterm Exam		
	Final Exam	1	30

<b>Course Objectives and Goals</b>	Teaching the calculation and design methods of steel space carrier systems
<b>Course Content</b>	<ol style="list-style-type: none"><li>1. To introduction of steel space system structures</li><li>2. The advantage and disadvantages of steel space system structures</li><li>3. The member of steel space system structures</li><li>4. To form of steel space system structures</li><li>5. Analysis methods</li><li>6. Matrix displacement method</li><li>7. Finite element method</li><li>8. The application of steel space system structures in Turkey</li><li>9. The analysis of steel space system structures by SAP2000 program</li><li>10. The analysis of steel space system structures by SAP2000 program</li><li>11. To give project data.</li><li>12. The analysis of project</li><li>13. The analysis of project</li><li>14. The analysis of project</li></ol>
<b>Course Learning Outcomes</b>	Introduction of space launch systems, and the ability to perform their calculation and design
<b>Recommended Resources</b>	-Uzay Kafes Taşıyıcı Sistemler, Prof. Dr. Tefik Seno ARDA -Çelik Yapıların Hesap ve Yapım Esasları Yönetmeği ve Uygulama Kılavuzu - SAP2000 Computer Software



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Structure</b>

M. Sc. X ...		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011026	TALL BUILDINGS	... Fall	T	P	ECTS
		X Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
Prof. Dr. S. Bahadır YÜKSEL	X Turkish	Must	Elective	Face to face	Online
	... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	2	40
	Project	1	60
	Midterm Exam		
	Final Exam		

<b>Course Objectives and Goals</b>	1- To provide information about the structural behavior of high-rise buildings 2- To provide information about the analysis of high-rise buildings 3- To provide information about the design of high-rise buildings
<b>Course Content</b>	1- Scope and definition of high-rise buildings 2- Performance objectives and design phases of tall buildings 3- Performance objectives and design phases of tall buildings 4- Behavioral characteristics of structural system elements of tall buildings 5- Behavioral characteristics of structural system elements of tall buildings 6- Behavioral characteristics of structural system elements of tall buildings 7- Calculation principles for preliminary design and dimensioning of tall buildings 8- Calculation principles for preliminary design and dimensioning of tall buildings 9- Calculation principles for preliminary design and dimensioning of tall buildings 10- Calculation principles for collapse prevention or controlled damage performance assessment of high-rise buildings 11- Calculation principles for collapse prevention or controlled damage performance assessment of high-rise buildings 12- Calculation principles for collapse prevention or controlled damage performance assessment of high-rise buildings 13- Finalization of the design of high-rise buildings 14- Design of foundations of high-rise buildings

<b>Course Learning Outcomes</b>	<p>1- To have knowledge about the structural behavior of high-rise buildings</p> <p>2- Ability to analyze high-rise buildings</p> <p>3- Ability to design high-rise buildings</p>
<b>Recommended Resources</b>	<p>1. Paulay, T. and Priestley, M.J.N., (1992), <i>Seismic Design of Reinforced Concrete and Masonry Buildings</i>, John Wiley&amp;Sons, Inc., New York.</p> <p>2. Stanford Smith, B. and Coull, A., (1991), <i>Tall Building Structures Analysis and Design</i>, John Wiley &amp; Sons, Inc, USA.</p> <p>3. Özden, K., Kumbasar, N., (1993), <i>Betonarme Yüksek Binalar</i>, İstanbul Teknik Üniversitesi İnşaat Fakültesi Matbaası, İstanbul.</p> <p>4. Celep, Z., (2020), <i>Betonarme Taşıyıcı Sistemlerde Doğrusal Olmayan Davranış ve Çözümleme</i>, Türkiye Bina Deprem Yönetmeliği (2018) Kavramları, Beta Basın Yayın Dağıtım A.Ş. İstanbul.</p> <p>5. Darılmaz, K., (2023), <i>Depreme Dayanıklı Binaların Tasarımına Giriş</i>, Birsen Yayınevi, Genişletilmiş 2. Baskı, İstanbul.</p> <p>6. Chopra, A. K. (2023), <i>Dynamics of Structures, Theory and Application to Earthquake Engineering</i>, 6th edition.</p> <p>7. TBDY-2018, (2018), <i>Türkiye Bina Deprem Yönetmeliği</i>, T.C. Bayındırlık ve İskân Bakanlığı, Ankara.</p> <p>8. TS500-2000, (2000), <i>Betonarme Yapıların Tasarım ve Yapım Kuralları</i>, Türk Standardları Enstitüsü, Bakanlıklar / Ankara.</p>



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Structure</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011028	Analytical Modeling of Structural System	... Fall	T	P	ECTS
		X Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
Prof. Dr. S. Bahadır YÜKSEL	X Turkish ... English	Must	Elective	Face to face	Online
			X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	2	20
	Project	1	40
	Midterm Exam		
	Final Exam	1	40

<b>Course Objectives and Goals</b>	To provide students with advanced knowledge about analytical modeling of structural systems
<b>Course Content</b>	<ol style="list-style-type: none"> <li>1- Fundamental principles of modeling, fundamental assumptions, behavior of members</li> <li>2- Frame element, plane element, plate element, three dimensional solid elements</li> <li>3- Material behavior</li> <li>4- Modeling of the plane stress, plane strain case</li> <li>5- Effect of shear deformation, modeling of nonlinear material</li> <li>6- Modeling of linear and non-linear systems, isoparametric elements</li> <li>7- Behavior of soils, modeling of soil structure interaction</li> <li>8- Effect of temperature change, creep and shrinkage</li> <li>9- System modeling, frames, structural walls, plates, using symmetry</li> <li>10- Modeling of plane, shell and building type structures</li> <li>11- Reduction of degrees of freedoms</li> <li>12- Equation of motion of single and multi-degrees of freedoms</li> <li>13- Dynamic model</li> <li>14- Evaluation analysis results</li> </ol>
<b>Course Learning Outcomes</b>	<ol style="list-style-type: none"> <li>1- Ability to create two-dimensional and three-dimensional models of building systems</li> <li>2- Ability to perform two-dimensional and three-dimensional analysis of building systems</li> <li>3-To be able to interpret the analysis results of Building Systems</li> </ol>

**Recommended Resources**

1. Krishnamoorthy, C.S., (1986), *Finite Element Analysis*, Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. Paulay, T. and Priestley, M.J.N., (1992), *Seismic Design of Reinforced Concrete and Masonry Buildings*, John Wiley&Sons, Inc., New York.
3. Yang T.Y., (1992), *Finite Element Structural Analysis*, Prentice-Hall Publ. Co., New York.
4. Chopra, A. K. (2023), *Dynamics of Structures, Theory and Application to Earthquake Engineering*, 6th edition.
5. TBDY-2018, (2018), *Türkiye Bina Deprem Yönetmeliği*, T.C. Bayındırlık ve İskân Bakanlığı, Ankara.
6. TS500-2000, (2000), *Betonarme Yapıların Tasarım ve Yapım Kuralları*, Türk Standardları Enstitüsü, Bakanlıklar / Ankara.



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Structure</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011030	Composite Structures of Concrete and Steel	... Fall	T	P	ECTS
		X Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Assoc.Prof.Dr. Günnur YAVUZ	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	2	50
	Project		
	Midterm Exam		
	Final Exam	1	50

<b>Course Objectives and Goals</b>	Understanding the properties of concrete-steel composite structural members, analysis of concrete-steel composite structures and investigation of design rules, investigation of code specifications related to the structural design of concrete-steel composite structures.
<b>Course Content</b>	1- Definition of composite structures of concrete and steel, analysis and design methods 2- Composite structural member types 3- Composite beams 4- Types of composite beams, prestressing in composite beams 5- Interaction between shear force and bending moment, interaction between axial force and bending moment, deflections 6- Shear connectors 7- Composite beam examples 8- Composite columns 9- Design rules in composite columns 10- Composite column examples 11- Composite slabs 12- Composite slab examples 13- The effect of composite slabs on analysis of composite beam 14- Composite column-beam connections 15- Investigation of recent studies on composite structures
<b>Course Learning Outcomes</b>	Achieve design of concrete-steel composite structural members. Achieve design of concrete-steel composite structural connections. Use of codes related to composite structure design. Investigation of current literature related to design of composite structures.
<b>Recommended Resources</b>	1- Arda, S.A., Yardımcı, N., Çelik Yapıda Karma Elemanların Plastik Hesabı, Birsen Yayınevi, 2000.

	<p>2- Johnson, R.P., Composite Structures of Steel and Concrete, Blackwell Scientific Publications, 1994.</p> <p>3- Bradford, M., Elementary Behaviour of Composite Steel and Concrete Structural Members, , Oxford, 1999.</p> <p>4- Oehlers, D.J. and Bradford, M.A., Composite Steel and Concrete Structural Members: Fundamental Behaviour, Pergamon,UK,1995.1.</p> <p>5- Çelik Yapıların Tasarım, Hesap ve Yapım Esaslarına Dair Yönetmelik, 2018.</p>
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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Structure</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011043	Design of Earthquake Resistant Steel Structures	X Fall ... Spring	T 3	P 0	ECTS 5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
Assoc.Prof.Dr. Günnur YAVUZ	X Turkish ... English	Must	Elective	Face to face	Online
			X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	2	50
	Project		
	Midterm Exam		
	Final Exam	1	50

<b>Course Objectives and Goals</b>	Understanding the effect of steel material properties and behaviour of steel structural systems under earthquake effect, investigation of design rules, understanding the effect of inelastic behaviour of structural steel system members on energy dissipation capacity, investigation of code specifications related to the design of <u>earthquake resistant steel structures</u> .
<b>Course Content</b>	1- Earthquake and steel structures 2- Material properties of structural steel 3- Behaviour types of structural steel members 4- Basic concepts in earthquake engineering 5- Ductility and energy absorption capacity of steel and plastic hinge concept 6- Inelastic behaviour under cyclic loading 7- Steel structural system types 8- Centrically braced frames 9- Eccentrically braced frames 10- Moment-resisting frames 11- Steel column-beam connections 12- Rigid column beam connections in frames with limited ductility level 13- Design of frames with high ductility level 14- Ductile beam-column connections 15- Investigation of recent studies on steel structures under seismic effects
<b>Course Learning Outcomes</b>	Learning of seismic behaviour of steel structures. Achieve earthquake resistant design of a steel structure. Design of structural connections to achieve structural ductility. Use of codes related to earthquake resistant design of steel structures. Investigation of current literature related to earthquake resistant design of steel

	structures.
<b>Recommended Resources</b>	<ol style="list-style-type: none"><li>1. Deren, H., Uzgider, E., Pirođlu, F., ađlayan, . elik Yapılar, ađlayan Kitabevi, 2012.</li><li>2- Bruneau, M., Uang, C.-M. and Whittaker, A., Ductile Design of Steel Structures, 2nd edition , McGraw Hill Co. Inc. , 2011.</li><li>3- Trkiye Bina Deprem Ynetmeliđi, 2018.</li><li>4- elik Yapıların Tasarım, Hesap ve Yapım Esaslarına Dair Ynetmelik, 2018.</li><li>5- AISC 341-16, Seismic Provisions for Structural Steel Buildings, 2016.</li></ol>



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Structure</b>

M. Sc. X		Ph.D. ...				
Course Code	Course Name	Semester (X)		Credit		
8222011046	Analysis and Design of Reinforced Concrete Bridges	X	Fall	T	P	ECTS
		...	Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)		
Prof. Dr. S. Bahadır YÜKSEL	X	Turkish	Must	Elective	Face to face	Online
	...	English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	2	20
	Project	1	40
	Midterm Exam		
	Final Exam	1	40

<b>Course Objectives and Goals</b>	To provide students with information on the structural behavior, analysis and design of reinforced concrete bridges
<b>Course Content</b>	1- Reinforced Concrete Highway Bridges 2- Loads, dead loads, live loads, vehicle loads, pedestrians loads 3- longitudinal forces, breaking forces, wind loads, temperature effects, snow loads 4- Shrinkage, creep, soil effects 5- Dynamic analysis of reinforced concrete bridges 6- Earthquake effects on the reinforced concrete bridges 7- Members of bridges, slabs, main beams 8- Static analysis of main simply supported beams of reinforced concrete highway bridges 9- Beams of highway bridges with internal hinges 10- Bending moments and shear force influence lines of highway bridges with constant moment of inertias 11- Min beams of the highway bridges with variable moment of inertias 12- Analysis of plate bridges 13- Analysis and design of reinforced concrete bridge piers 14- Analysis and design of reinforced concrete bridge footings
<b>Course Learning Outcomes</b>	1- Understanding the structural behavior of reinforced concrete bridges 2- Ability to analyze reinforced concrete bridges 3- Ability to design reinforced concrete bridges

**Recommended Resources**

1. Ekiz, İ., (1981), *Çözümlü Köprü Problemleri*, Çağlayan Kitabevi, Beyoğlu, İstanbul.
2. Celasun, H., (1974), *Betonarme Köprüler*, Çağlayan Kitabevi, Beyoğlu, İstanbul.
3. Raina, V. K., (1996), *Concrete Bridges*, Tata McGraw-Hill Publishing Company Limited.
4. Cope, R.J., (1987), *Concrete Bridge Engineering: Performance and Advances*, Elsevier Applied Science Publisher.
5. AASHTO-2016, (2016), *Köprü Tasarım Şartnamesi (LRFD)*, Karayolları Genel Müdürlüğü, Ankara.
6. Chopra, A. K. (2023), *Dynamics of Structures, Theory and Application to Earthquake Engineering*, 6th edition.
7. TBDY-2018, (2018), *Türkiye Bina Deprem Yönetmeliği*, T.C. Bayındırlık ve İskân Bakanlığı, Ankara.



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Institute	Graduate Education Institute
Department	Civil Engineering
Division/Program	Structure

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011047	Analysis and Design of Steel Bridges	X Fall	T	P	ECTS
		Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof. Dr. S. Bahadır YÜKSEL	... X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	2	20
	Project	1	40
	Midterm Exam		
	Final Exam	1	40

<b>Course Objectives and Goals</b>	To provide students with information on the structural behavior, analysis and design of steel bridges
<b>Course Content</b>	1- Dead loads 2- Live loads 3- Special loads 4- Steel bridge elements 5- Steel bridge elements 6- Steel bridge elements 7- Analysis of steel bridges under the influence of static loads 8- Analysis of steel bridges under the influence of dynamic loads 9- Analysis of steel bridges under the influence of seismic loads 10- Analysis of steel bridges under the influence of seismic loads 11- Analysis and design of steel bridge piers 12- Analysis and design of steel bridge piers 13- Analysis and design of steel bridge piers 14- Analysis and design of steel bridge foundations
<b>Course Learning Outcomes</b>	1- Understanding the structural behavior of steel bridges 2- Ability to analyze steel bridges 3- Ability to design steel bridges
<b>Recommended Resources</b>	1. Ekiz, İ., (1981), <i>Çözümlü Köprü Problemleri</i> , Çağlayan Kitabevi, Beyoğlu, İstanbul. 2. Celasun, H., (1972), <i>Çelik Köprü Atlası</i> , Çağlayan Kitabevi, Beyoğlu, İstanbul. 3. Celasun, H., (1974), <i>Betonarme Köprüler</i> , Çağlayan Kitabevi, Beyoğlu, İstanbul.

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|--|---|
|  | <ol style="list-style-type: none"><li>4. AASHTO-2016, (2016), <i>Köprü Tasarım Şartnamesi (LRFD)</i>, Karayolları Genel Müdürlüğü, Ankara.</li><li>5. Chopra, A. K. (2023), <i>Dynamics of Structures, Theory and Application to Earthquake Engineering</i>, 6th edition.</li><li>6. TBDY-2018, (2018), <i>Türkiye Bina Deprem Yönetmeliği</i>, T.C. Bayındırlık ve İskân Bakanlığı, Ankara.</li><li>7. ÇYTHYE-2016, (2018), <i>Çelik Yapıların Tasarım, Hesap ve Yapım Esaslarına Dair Yönetmelik Çevre ve Şehircilik Bakanlığı</i>, Ankara.</li></ol> |
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Institute	Graduate Education Institute
Department	Civil Engineering
Division/Program	Structure

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011054	Analysis and Design of Composite Bridges	X Fall	T	P	ECTS
		Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
Prof. Dr. S. Bahadır YÜKSEL	... X Turkish	Must	Elective	Face to face	Online
	... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	2	20
	Project	1	40
	Midterm Exam		
	Final Exam	1	40

<b>Course Objectives and Goals</b>	To provide students with information on the structural behavior, analysis and design of composite bridges
<b>Course Content</b>	1- General subjects about composite materials 2- General design rules about composite structures 3- Steel and composite connection rules 4- Steel and composite structural elements and design rules 5- Main loads for composite bridges 6- Secondary loads for composite bridges 7- Special loads and construction stages 8- Examination of stresses 9- Composite bridge columns 10- Composite bridge columns 11- Composite bridge beams 12- Composite bridge beams 13- Composite bridge column-beam connections 14- Composite bridge column-beam connections
<b>Course Learning Outcomes</b>	1- Understanding the structural behavior of composite bridges 2- Ability to analyze composite bridges 3- Ability to design composite bridges
<b>Recommended Resources</b>	1. Ekiz, İ., (1981), <i>Çözümlü Köprü Problemleri</i> , Çağlayan Kitabevi, Beyoğlu, İstanbul. 2. Celasun, H., (1972), <i>Çelik Köprü Atlası</i> , Çağlayan Kitabevi, Beyoğlu, İstanbul. 3. Celasun, H., (1974), <i>Betonarme Köprüler</i> , Çağlayan Kitabevi,

Beyođlu, İstanbul.

4. AASHTO-2016, (2016), *Köprü Tasarım Şartnamesi (LRFD)*, Karayolları Genel Müdürlüğü, Ankara.

5. Chopra, A. K. (2023), *Dynamics of Structures, Theory and Application to Earthquake Engineering*, 6th edition.

6. TBDY-2018, (2018), *Türkiye Bina Deprem Yönetmeliđi*, T.C. Bayındırlık ve İskân Bakanlığı, Ankara.

7. ÇYTHYE-2016, (2018), *Çelik Yapıların Tasarım, Hesap ve Yapım Esaslarına Dair Yönetmelik Çevre ve Şehircilik Bakanlığı*, Ankara.



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	

M. Sc. ...		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011057	REPAIRING AND STRENGTHENING OF REINFORCED CONCRETE STRUCTURES	... Fall	T	P	ECTS
		X Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
Prof. Dr. Murat Öztürk	X Turkish	Must	Elective	Face to face	Online
	... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project	1	40
	Midterm Exam		
	Final Exam	1	60

<b>Course Objectives and Goals</b>	Teaching the repair and strengthening techniques and methods of damaged and undamaged RC structures and provides the necessary information about the materials used in applications.
<b>Course Content</b>	1-The concept of repair and strengthening and basic principles 2-Damage types and detection in RC structures 3-Behavior of anchorage components 4-Building Safety philosophy and performance concept 5-Repair/strengthening methods 6-Strengthening of beams 7- Strengthening of columns 8- Strengthening of columns 9-Strengthening of shear walls, foundations and slabs 10-System Based Strengthening 11-System Based Strengthening 12- Strengthening examples 13- Strengthening examples 14-Presentation of term papers
<b>Course Learning Outcomes</b>	1. Teaches repair and strengthening techniques for damaged and undamaged reinforced concrete structures 2. Have knowledge about the materials used in repair and strengthening and their usage techniques. 3. Have knowledge about the problems and solution methods that may be encountered in repair and strengthening applications.
<b>Recommended Resources</b>	1. Lecture notes 2. Turkey Building Earthquake Code-2018





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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Structure</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011059	Special Studies for Reinforced Concrete	X Fall ... Spring	T 3	P 0	ECTS 5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
Prof. Dr. S. Bahadır YÜKSEL	X Turkish ... English	Must	Elective	Face to face	Online
			X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	2	20
	Project	1	40
	Midterm Exam		
	Final Exam	1	40

<b>Course Objectives and Goals</b>	To provide students with advanced knowledge about the behavior of reinforced concrete
<b>Course Content</b>	1- Special Rules for The Design of Reinforced Concrete Building Structural Systems 2- High Ductility Level Columns 3- High Ductility Level Beams 4- High Ductility Level Shear Walls 5- Columns, Beams, and Shear Walls with Limited Ductility Level 6- Deformation and Strength Dissipation in Reinforced Concrete Elements 7- Moment-curvature relationship 8- Moment-curvature relationship 9- Plastic Hinge Acceptance and Ductility 10- Capacity Design in Reinforced Concrete 11- Sectional Stiffness in Reinforced Concrete 12- Nonlinear Behavior 13- Evaluation and Design by Displacement based Method 14- Evaluation and Design by Displacement based Method
<b>Course Learning Outcomes</b>	1- To understand the structural behavior of reinforced concrete load-bearing elements 2- Ability to analyze and design reinforced concrete load-bearing elements 3-To be able to perform nonlinear analysis of reinforced concrete load-bearing elements

### Recommended Resources

1. Ersoy, U., Özcebe, G., Canbay, E., (2023), *Betonarme - Davranış ve Hesap İlkeleri - Cilt 1*, Nobel Akademik Yayıncılık.
2. Ersoy, U., Özcebe, G., Canbay, E., (2021), *Betonarme Cilt 2 - Özel Konular: TS 500-2000 ve TBDY-2019'a Uygun Olarak Geliştirilmiş Yeni Baskı*.
3. Park, R. and Paulay, T., (1975), *Reinforced Concrete Structures*, John Wiley& Sons, New York.
4. Paulay, T. and Priestley, M.J.N., (1992), *Seismic Design of Reinforced Concrete and Masonry Buildings*, John Wiley&Sons, Inc., New York.
5. Celep, Z., (2020), *Betonarme Taşıyıcı Sistemlerde Doğrusal Olmayan Davranış ve Çözümleme, Türkiye Bina Deprem Yönetmeliği (2018) Kavramları*, Beta Basın Yayın Dağıtım A.Ş. İstanbul.
6. Darılmaz, K., (2022), *Betonarme*, Birsen Yayınevi, İstanbul.
7. Darılmaz, K., (2023), *Depreme Dayanıklı Binaların Tasarımına Giriş*, Birsen Yayınevi, Genişletilmiş 2. Baskı, İstanbul.
8. Doğangün, A., (2024), *Betonarme Yapıların Hesap ve Tasarımı*, Birsen Yayınevi, 18. Baskı, İstanbul.
9. Celep, Z., (2024), *Betonarme Yapılar*, Birsen Yayınevi, Onbirinci ve TBDY (2018)'e uygun baskı, İstanbul.
10. Chopra, A. K. (2023), *Dynamics of Structures, Theory and Application to Earthquake Engineering*, 6th edition.
11. TBDY-2018, (2018), *Türkiye Bina Deprem Yönetmeliği*, T.C. Bayındırlık ve İskân Bakanlığı, Ankara.
12. TS500-2000, (2000), *Betonarme Yapıların Tasarım ve Yapım Kuralları*, Türk Standardları Enstitüsü, Bakanlıklar / Ankara.



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Institute	Graduate Education Institute
Department	Civil Engineering
Division/Program	Structure

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011064	Reinforced Concrete Plates	X Fall	T	P	ECTS
		Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof. Dr. S. Bahadır YÜKSEL	... X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	2	20
	Project	1	40
	Midterm Exam		
	Final Exam	1	40

<b>Course Objectives and Goals</b>	To provide students with information about the structural behavior, analysis and design of reinforced concrete slabs
<b>Course Content</b>	1- Slabs with Beam Working in One Direction 2- Slabs with Beam Working in Two Direction 3- Toothed Slabs Working in One Direction 4- Toothed Slabs Working in Two Direction 5-Slabs without beams 6- Slabs without beams 7- Structural Analysis with Elastic Plate Theory 8- Structural Analysis Using Yield Lines Method 9- Structural Analysis with the Equivalent Frame Method 10- Plate Foundations 11- Plate Foundations 12- Structural Analysis with Finite Element Method 13- Structural Analysis with Finite Element Method 14- Structural Analysis with Finite Element Method
<b>Course Learning Outcomes</b>	1- Understanding the structural behavior of reinforced concrete slabs 2- Ability to analyze reinforced concrete slabs 2- Ability to design reinforced concrete slabs
<b>Recommended Resources</b>	1. Park, R. and Paulay, T., (1975), <i>Reinforced Concrete Structures</i> , John Wiley& Sons, New York. 2. Paulay, T. and Priestley, M.J.N., (1992), <i>Seismic Design of Reinforced Concrete and Masonry Buildings</i> , John Wiley&Sons, Inc., New York. 3. Darılmaz, K., (2022), <i>Betonarme</i> , Birsen Yayınevi, İstanbul.

4. Darılmaz, K., (2023), *Depreme Dayanıklı Binaların Tasarımına Giriş*, Birsen Yayınevi, Genişletilmiş 2. Baskı, İstanbul.
5. Doğangün, A., (2024), *Betonarme Yapıların Hesap ve Tasarımı*, Birsen Yayınevi, 18. Baskı, İstanbul.
6. Celep, Z., (2024), *Betonarme Yapılar*, Birsen Yayınevi, Onbirinci ve TBDY (2018)'e uygun baskı, İstanbul.
7. TBDY-2018, (2018), *Türkiye Bina Deprem Yönetmeliği*, T.C. Bayındırlık ve İskân Bakanlığı, Ankara.
8. TS500-2000, (2000), *Betonarme Yapıların Tasarım ve Yapım Kuralları*, Türk Standardları Enstitüsü, Bakanlıklar / Ankara.



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Structure</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011005	Reinforced Concrete of Structural Systems	... Fall X Spring	T 3	P 0	ECTS 5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
Assist. Prof. Nail KARA	X Turkish ... English	Must	Elective	Face to face	Online
			X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project		
	Midterm Exam		
	Final Exam		<b>100</b>

<b>Course Objectives and Goals</b>	The damage seen in buildings as a result of earthquakes that have occurred in the world in recent years has revealed the importance of the selection of the structural system of the buildings. In this course, the load-bearing systems used in reinforced concrete structures are explained, the points to be considered in the selection of the load-bearing system, and the load-bearing systems of roofs covering large areas and industrial buildings are examined.
<b>Course Content</b>	<ol style="list-style-type: none"> <li>1- Introduction</li> <li>2- General acknowledgments for pre desing of structural systems</li> <li>3- General acknowledgments for static desing of structural systems.</li> <li>4- Loads</li> <li>5- Design procedures</li> <li>6- Examples of practise</li> <li>7- Floors</li> <li>8- Design of structural systems</li> <li>9- Cold joints</li> <li>10- Highrise buildings</li> <li>11- RC roofs</li> <li>12- Industrial Structures</li> <li>13- Examples of practise</li> <li>14- Examples of practise</li> </ol>
<b>Course Learning Outcomes</b>	Structural system selection Structural system pre-sizing Structural system layout principles Industrial buildings
<b>Recommended Resources</b>	<ol style="list-style-type: none"> <li>1.Aka, İ.; Altan, M.; Betonarme Taşıyıcı Sistemler, İ.T.Ü. İnşaat Fakültesi 1992.</li> <li>2. TS 500, Betonarme Yapıların Tasarım ve Yapım Kuralları, 1985.</li> <li>3. Hochhauser aus Stahlbeton, Beton Kalender, 1990, Teil II, Ernst &amp; Sohn, 1990</li> </ol>



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Structure</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011018	Reinforced Concrete Foundations	X Fall	T	P	ECTS
		Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Assist. Prof. Nail KARA	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	5	40
	Project		
	Midterm Exam		
	Final Exam	1	60

<b>Course Objectives and Goals</b>	Some of the damages in structures are caused because of improper selection of foundation type. In this lecture foundation types and important factors for the selection of foundation types are studied
<b>Course Content</b>	1- Introduction 2- Classification of soils and soil testing 3- Under-wall foundations 4- Calculation methods for single foundations 5- Calculation methods for single-direction continuous foundations 6- Application examples of continuous foundations 7- Calculation methods for foundations on elastic soil 8- Application examples of continuous foundations on elastic soil 9- Calculation methods for two-direction continuous foundations 10- Calculation methods for beams-raft foundations 11- Calculation methods for floor-raft foundations 12- Calculation methods for pile foundations 13- Calculation of earth retaining walls and foundations 14- Applied examples
<b>Course Learning Outcomes</b>	Soil Classification and Soil Testing Continuous Foundations Foundations on Elastic Soil Beam and floor - Raft Foundations
<b>Recommended Resources</b>	1. Özden, K.-Trupia, A - Sayğun, A. ,Betonarme Yüzeysel Temeller, 2009 2. Keskinel, F.-Kumbasar, N.,Sürekli Temeller ve Dönel Kabuklar, İTÜ 1976 3. Köseoğlu,S. Temeller I-II , 2017 4. Celep, Z.- Kumbasar, N. Betonarme Yapılar, 1998.



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Civil Engineering (Structure)</b>

M. Sc. X		Ph.D. ...				
Course Code	Course Name	Semester (X)		Credit		
8222011066	Composite Materials and Application Areas in Civil Engineering	X	Fall	T	P	ECTS
		...	Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
	... Turkish ... English	Must	Elective	Face to face	Online

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	1	30
	Project	1	70
	Midterm Exam		
	Final Exam		

<b>Course Objectives and Goals</b>	To understand the types, applications, and computational procedures of composite materials used in civil engineering.
<b>Course Content</b>	<ul style="list-style-type: none"> <li>1-Historical Development of Fiber-Reinforced Polymer (FRP) Materials</li> <li>2-Fundamental Definitions and Terminology of Fiber-Reinforced Polymers</li> <li>3-Types of Composite Materials and Their Mechanical Advantages</li> <li>4-Material Properties of Matrix and Fiber Constituents Used in Composites</li> <li>5-Mechanical Behavior of Composite Materials</li> <li>6-Mechanical Properties of Fiber-Reinforced Ductile Materials</li> <li>7-Influence of Fiber Discontinuity and Orientation on Mechanical Performance</li> <li>8-Ductile Fiber – Brittle Matrix Composite Systems</li> <li>9-Behavior of Structural Members Strengthened with FRP Composites under Gravity Loads</li> <li>10-Review of Design Codes and Standards Related to Fiber-Reinforced Polymers</li> <li>11-Design Principles and Analytical Approaches for FRP Strengthening Systems</li> <li>12-Applications of FRP Composites in Structural Engineering</li> <li>13-Design Applications for Shear and Flexural Strengthening Using FRP Systems</li> <li>14-Presentation and Discussion of Experimental and Theoretical Studies</li> </ul>

<p><b>Course Learning Outcomes</b></p>	<p><b>-To gain in-depth knowledge of the fundamental properties and mechanical behavior of fiber-reinforced polymer (FRP) materials.</b></p> <p><b>-To examine the behavior and performance characteristics of structural systems strengthened with FRP materials.</b></p> <p><b>-To acquire fundamental knowledge of design principles for strengthening existing structures with FRP, in accordance with current standards and regulations.</b></p> <p><b>-To understand the effects of common deficiencies in existing structures on their structural behavior.</b></p> <p><b>-To plan and conduct experimental research or design and analyze the behavior of structures strengthened with FRP materials.</b></p>
<p><b>Recommended Resources</b></p>	<p>Daniel Gay, Suong V. Hoa, Stephen W. Tsai., Composite Materials design and application. CRC Press, Boca Raton London, New York, Washington, D.C.,523 sayfa , 2003</p> <p>Referanslar: Kaw, A,K., : Mechanics of Composite Materials, Taylor and Francis Group, Boca Raton, London, New York, 473 sayfa, 2006.</p> <p>Gibson, R, F., Principles of Composite Material Mechanics, Mcgraw-Hill, INC, New York, 446 sayfa, 1994.</p> <p>Case, J, Chilver, L, Ross, C,T,F., Strength of Materials and Structures. John Wiley&amp;Sons., New York, Toronto, 719 sayfa, 1999.</p> <p>Strengthening and Rehabilitation of Civil Infrastructures using Fibre-Reinforced Polymer (FRP) Composites, L.C. Hollaway, J.G. Teng, Woodhead Publishing Ltd, 2008.</p> <p>Strengthening of Reinforced Concrete Structures with Carbon Fiber-Reinforced Polymer Composites, Dowaksa</p>



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Construction Materials</b>

M. Sc. x		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222001002	Concrete mixtures and early age properties of concrete	... Fall	T	P	ECTS
		x Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Assoc. Prof. Oğuzhan Öztürk	x Turkish x English		x	x	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project		
	Midterm Exam		
	Final Exam	1	%100

<b>Course Objectives and Goals</b>	<p>This course aims to make concrete design more permanent, sustainable and environmentally friendly for students, researchers and application engineers in the concrete industry and to make concrete properties more suitable for different applications.</p> <p>Course objectives;</p> <ul style="list-style-type: none"><li>-To acquire the properties of the materials that are used in the design of concrete</li><li>-Water, cement, aggregate, mineral additives and chemical additives</li><li>-Designing concrete mixtures for a desired concrete and completing the quality and control processes</li><li>-Assurance of the early age properties of concrete</li><li>-Concrete properties with non-destructive test methods</li></ul>
<b>Course Content</b>	<p>2-3. week. Hydraulic binders 4-5. week: Aggregates 6-7. week: Admixtures 8-9. week: Design of concrete mixes 10-11. week: Early age concrete 12-13. week: Non-destructive test methods</p>

<p><b>Course Learning Outcomes</b></p>	<ol style="list-style-type: none"> <li>1. Hydraulic and non-hydraulic binders are defined. Knowledge about Portland cement production processes, chemical composition, analysis, crystal structure and content reactivity is presented.</li> <li>2. Knowledge is acquired about hydration formation of Portland cement, hydration kinetics, hydration development of aluminates and silicates.</li> <li>3. Topics of hydration temperature, physical aspects of set, different Portland cement types, content and use of special hydraulic binders are covered.</li> <li>4. Natural aggregates, lightweight aggregates, heavy aggregates, etc. Classification of aggregates is addressed. Aggregate production is acquired. The effects of aggregate water absorption, surface moisture, fracture resistance, abrasion, elastic modulus, hardness, shape and gradation properties on concrete are acquired in detail.</li> <li>5. Concrete admixtures are examined as mineral and chemical admixtures. The knowledge about the importance, classification and applications of surface active chemicals, set regulating additives and mineral additives is presented.</li> <li>6. Concrete mixture ratios are discussed over aspects such as cost, workability, strength, durability, ideal aggregate gradation.</li> <li>7. Procedures are applied during the preparation of concrete mixture.</li> <li>8. Starting from the fresh properties of early concrete, its definitions, importance, mixing, handling, workable properties, segregation control, setting time, early age cracks are defined. Before and after the occurrence of problems related to concrete are addressed and relevant precautions are taken.</li> </ol>
<p><b>Recommended Resources</b></p>	<ul style="list-style-type: none"> <li>-Beton, Turhan Erdoğan (kitap)</li> <li>-Introduction to Material Science for Civil Engineers, Turhan Erdoğan, İ.Özgür Yaman, Mustafa Tokyay Sinan Erdoğan (kitap)</li> <li>-Concrete, Microstructure, Properties and Materials, Kumar Mehta, Paulo Monteiro (kitap)</li> <li>-Lecture notes (pdf or/and ppt)</li> </ul>



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Construction Materials</b>

M. Sc. x		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222001020	Hardened Concrete Properties	... Fall	T	P	ECTS
		x Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Assoc. Prof. Oğuzhan Öztürk	x Turkish x English		x	x	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project		
	Midterm Exam		
	Final Exam	1	%100

<b>Course Objectives and Goals</b>	<p>This course aims for students, researchers and application engineers in the concrete industry to understand the properties of hardened concrete in relation to strength, modulus of elasticity, shrinkage, creep, tensile stress capacity, permeability, various causes and stages of deterioration for more permanent, sustainable and environmentally friendly concrete applications.</p> <p>Course objectives;</p> <p>As a structural material;</p> <ul style="list-style-type: none"><li>-strength properties of concrete,</li><li>-modulus of elasticity,</li><li>-dimensional stability,</li><li>-microstructure features,</li></ul> <p>-to recognize the durability properties and to reveal the relationship between each other.</p>
<b>Course Content</b>	<p>2-3. week. Hydraulic binders 4-5. week: Aggregates 6-7. week: Admixtures 8-9. week: Design of concrete mixes 10-11. week: Early age concrete 12-13. week: Non-destructive test methods</p>

<p><b>Course Learning Outcomes</b></p>	<ol style="list-style-type: none"> <li>1. Information about aggregate microstructure, microstructure of hydrated cement (water in hydrated cement paste, solid particles, voids) is acquired.</li> <li>2. The importance of the interface zone in concrete, its effect on strength and other properties of concrete is understood.</li> <li>3. Strength-void distribution relationship, fracture modes in concrete, curing and test parameters affecting compressive strength properties, behavior of concrete under different stresses are learned.</li> <li>4. Dimensional stability of concrete, elastic behavior, stress-strain non-linear behavior, static modulus of elasticity, Poisson's ratio and factors affecting the modulus of elasticity are learned.</li> <li>5. With regard to drying shrinkage and creep, the causes, loading and moisture conditions, viscoelastic behavior, reversibility, and thermal shrinkage are understood.</li> <li>6. Information about the durability of concrete, permeability, freezing, fire effect, deterioration of concrete as a result of chemical changes, sulfate attack, alkali-aggregate reaction, the effect of MgO and CaO hydration, corrosion, concrete properties in marine structures.</li> <li>7. At the end of the course, a holistic model of hardened concrete's durability problems will be revealed.</li> </ol>
<p><b>Recommended Resources</b></p>	<ul style="list-style-type: none"> <li>-Beton, Turhan Erdoğan (kitap)</li> <li>-Introduction to Material Science for Civil Engineers, Turhan Erdoğan, İ.Özgür Yaman, Mustafa Tokyay Sinan Erdoğan (kitap)</li> <li>-Concrete, Microstructure, Properties and Materials, Kumar Mehta, Paulo Monteiro (kitap)</li> <li>-Lecture notes (pdf or/and ppt)</li> </ul>



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Material Science</b>

M. Sc. X		Ph.D. .			
Course Code	Course Name	Semester (X)	Credit		
8222011013	ADVANCED CONCRETE TECHNOLOGY	.... Fall	T	P	ECTS
		X Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof. Dr. Ülkü Sultan KESKİN	X Turkish ... English				
			X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project		
	Midterm Exam		
	Final Exam	<b>1</b>	<b>100</b>

<b>Course Objectives and Goals</b>	The objective of this course is to provide students with detailed information on advanced concrete technologies, high-performance concrete types, their properties, and their applications.
<b>Course Content</b>	<ol style="list-style-type: none"> <li>1- Normal concrete technology and cements</li> <li>2- Concrete poured under abnormal weather conditions</li> <li>3- Prepack concrete, underwater concrete, and vacuum concrete</li> <li>4- Sprayed concrete, injection mortar</li> <li>5- Lightweight concrete</li> <li>6- Road and airport concrete</li> <li>7- Heavy concrete</li> <li>8- Fire-resistant concrete</li> <li>9- Thermal treatment in prefabrication</li> <li>10- Ready-mix concrete</li> <li>11- Newly developed concrete materials and concrete additives</li> <li>12- Evaluation of core samples</li> <li>13- Inspection and quality control</li> <li>14- Non-destructive inspection methods</li> </ol>
<b>Course Learning Outcomes</b>	Provides information on current concrete technologies. Provides information on special concrete types. Identifies problems where needed and recommends concrete types.
<b>Recommended Resources</b>	Li, Z. (2011), "Advanced Concrete Technology", John Wiley & Sons.



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<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Materials Science</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011037	CONCRETE QUALITY CONTROL	... Fall	T	P	ECTS
		X Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof. Dr. Ülkü Sultan KESKİN	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment		
	Project		
	Midterm Exam		
	Final Exam	1	100

<b>Course Objectives and Goals</b>	The aim of this course is to provide students with knowledge on quality control of concrete, concrete components, and reinforced concrete components, as well as on conducting experimental processes.
<b>Course Content</b>	<ol style="list-style-type: none"><li>1- Concrete and concrete materials</li><li>2- Chemical and mineral admixtures</li><li>3- Material properties</li><li>4- Material testing</li><li>5- Concrete testing</li><li>6- Concrete reinforcement testing</li><li>7- Quality control issues</li><li>8- Quality control through concrete testing</li><li>9- Quality control during concrete production</li><li>10- Quality control after concrete production</li><li>11- Standards and reporting</li><li>12- Statistical methods</li><li>13- Regulations and applications</li><li>14- Inspection and responsibilities</li></ol>
<b>Course Learning Outcomes</b>	Provides information about the quality control of concrete and its components. Monitors regulations and standards. Provides information about responsibilities and reporting.
<b>Recommended Resources</b>	Concrete - Turhan ERDOĞAN



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<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Construction Materials</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011058	Alternative Building Materials	... Fall	T	P	ECTS
		X Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Assoc. Prof. Dr. Arife AKIN	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	2	100
	Project		
	Midterm Exam		
	Final Exam		

<b>Course Objectives and Goals</b>	<b>To introduce the production and applications of construction materials other than concrete used in Civil Engineering (steel, wood, polymers, wall elements, etc.)</b>
<b>Course Content</b>	1-Introduction to Alternative Building Materials 2-Production, applications, and mechanical and physical properties of steel building materials 3-Production, applications, and mechanical and physical properties of steel building materials 4-Production, applications, and mechanical and physical properties of polymer materials 5-Introduction to the properties, applications, types, mechanical and physical properties of wood construction materials 6-Introduction to the production, applications, mechanical and physical properties of glass materials 7-Introduction to the production, applications, mechanical and physical properties of aluminum construction materials 8-Introduction to the production, applications, mechanical and physical properties of aluminum construction materials 9-Introduction to the production, areas of use, mechanical and physical properties of materials used in partition wall elements 10-Listening to student presentations 11-Listening to student presentations 12-Listening to student presentations 13-Listening to student presentations 14-Listening to student presentations

<b>Course Learning Outcomes</b>	1- Understanding the principles and standards related to the production, use, and application of alternative building materials in the context of technological developments, as well as their environmental impacts. 2- Being knowledgeable about current building materials. 3- Being knowledgeable about the details of reuse after production and use of alternative building materials.
<b>Recommended Resources</b>	Course Notes



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<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Construction Materials</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222011060	Special Concrete and Production Techniques	X Fall	T	P	ECTS
		... Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Assoc. Prof. Dr. Arife AKIN	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	2	100
	Project		
	Midterm Exam		
	Final Exam		

<b>Course Objectives and Goals</b>	<b>To provide information about the production, advantages, disadvantages, characteristics, and applications of special concrete.</b>
<b>Course Content</b>	1-Introduction- Special Concrete and Production Techniques 2-Lightweight Concrete 3-Heavyweight Concrete 4-Self-Compacting Concrete 5-Polymer Concrete 6-Polymer Fiber-Reinforced Concrete 7-Steel Fiber-Reinforced Concrete 8-Prepack and Sprayed Concrete 9-Cylinder-Compacted Concrete 10-Reactive Powder Concrete 11-Sifcon 12-High-Performance Concrete 13-Vacuum Concrete and Underwater Concrete 14-Listening to student presentations
<b>Course Learning Outcomes</b>	1- Recognizes special concretes 2- Learns the design criteria for different special concretes 3- Acquires knowledge about the mechanical and physical properties of different special concretes. 4- Acquires knowledge about the application areas of different special concretes.
<b>Recommended Resources</b>	Course Notes



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<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Construction Materials</b>

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
.....	Destructive and Nondestructive Test Methods of Concrete	Fall X Spring	T 3	P 0	ECTS 5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
Dr. Murat SAYDAN	X Turkish	Must	Elective	Face to face	Online
	... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	4	40
	Project		
	Midterm Exam		
	Final Exam	1	60

<b>Course Objectives and Goals</b>	Learning the application of destructive and non-destructive test methods that can be used to determine the strength of hardened concrete, learning to choose which method can be used depending on the age of concrete and its condition in structures, learning to interpret and evaluate the obtained test results.
<b>Course Content</b>	<ol style="list-style-type: none"> <li>1- Introduction,</li> <li>2- Examination of test methods and the differences between them</li> <li>3- Visual inspection of concrete and reinforced concrete structural elements</li> <li>4- Choosing the right test methods according to the needs in determining concrete strength</li> <li>5- Destructive methods - Approach to strength estimation in core samples</li> <li>6- Partial destructive methods-penetration resistance, pull-out, pull off methods and strength estimation approach</li> <li>7- Non-destructive methods - strength estimation approach by test hammer method</li> <li>8- Strength development and strength prediction by maturity method in concrete</li> <li>9- Modulus of elasticity of concrete and methods that can be used to determine the modulus of elasticity</li> <li>10- Non-destructive methods - Modulus of elasticity and strength estimation approach by resonance frequency method</li> <li>11- Non-destructive methods - Strength estimation approach by sound velocity permeability method</li> <li>12- Examination of test methods to be used in determining permeability and permeability in concrete</li> <li>13- Prediction of concrete voids by non-destructive methods-</li> </ol>

	Impact-echo method 14- Detection of anomalies for concrete by infrared thermography
<b>Course Learning Outcomes</b>	To have knowledge about the determination of mechanical properties such as strength, modulus of elasticity and porosity affecting durability of previously casted and hardened concretes by using different test methods in concrete.
<b>Recommended Resources</b>	International Atomic Energy Agency, Guidebook on non-destructive testing of concrete structures,2002. Sardar Kashif Ur Rehman ,Zainah Ibrahim , Shazim Ali Memon , Mohammed Jameel, Nondestructive test methods for concrete bridges: A review,2016. In-Place Methods to Estimate Concrete Strength, ACI 228. 2R-13, 2013.



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Institute	Graduate Education Institute
Department	Civil Engineering
Division/Program	Construction Materials

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
8222001028	Building Materials Used in Historical Structures	X Fall	T	P	ECTS
		... Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Dr. Murat SAYDAN	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	4	40
	Project		
	Midterm Exam		
	Final Exam	1	60

<b>Course Objectives and Goals</b>	This course will comprehensively examine the fundamental building materials used in historical structures from past to present, along with their properties, deterioration mechanisms, and conservation methods.
<b>Course Content</b>	1-Introduction: Definition, importance, and the necessity of conserving historical structures. 2-Historical vs. Modern Building Materials: Differences between historical and modern building materials. 3-Natural Building Stones: Rock types (granite, marble, travertine, sandstone, etc.), their formation, and historical uses. 4-Fired Clay-Based Materials: Production techniques and historical development of brick, roof tile, ceramic tile, etc. 5-Wood: Types, properties, and structural uses. 6-Metals: The role of metals like iron, lead, and copper in historical structures. 7-Mineralogical and Petrographic Properties: Mineralogical and petrographic characteristics of the main stone types used in historical structures. 8-Physical and Mechanical Properties of Stones: Physical and mechanical properties of stones (density, porosity, compressive strength). 9-Lime Mortar: History, production, and properties of lime mortar. 10-Horasan Mortar (Hydraulic Lime Mortar): Composition, production, and strength properties of Horasan mortar. 11-Other Binders in Historical Structures: Other binders used in historical structures (gypsum, clay mortars). 12-Mortar Analysis Methods: Chemical, physical, and microscopic analysis methods for mortars. 13-Iron: Differences between wrought iron and cast iron, their

	<p>historical uses (fasteners, railings).  14-Lead: Use of lead in roof coverings, waterproofing, and stained glass.  15-Corrosion Mechanisms of Metals: Corrosion mechanisms of metals and their effects on historical structures.  16-Physical Deterioration: Freeze-thaw, salt crystallization, thermal expansion, abrasion.  17-Chemical Deterioration: Acid rain, carbonation, sulfate attack, dissolution.  18-Physical Tests: Porosity, water absorption, and density tests.  19-Mechanical Tests: Compressive strength tests (especially for mortar and brick).  20-International Principles: International principles such as the Venice Charter and the Granada Convention.</p>
<p><b>Course Learning Outcomes</b></p>	<p>Recognizing and Classifying Historical Building Materials:  Recognizes and correctly classifies fundamental building materials commonly used in historical structures, such as natural stone, brick, roof tile, historical mortars, wood, and metals.  Understanding and Evaluating Material Properties:  Comprehends the physical (density, porosity, water absorption), chemical (composition), and mechanical (compressive, tensile, flexural strength) properties of historical building materials.  Developing Repair and Strengthening Techniques:  Gains the ability to select and apply appropriate repair (mortar renewal, crack repair) and strengthening (material-compatible methods) techniques for the deterioration of historical materials.</p>
<p><b>Recommended Resources</b></p>	<p>Bernard M. Feilden - The Conservation of Historic Buildings:  Robert G. Waite - Building Materials: An Introduction to Historical and Modern Materials and Their Uses:  Jan Válek, John J. Hughes, Caspar J. W. P. Groot (Editors) - Historic Mortars: Characterisation, Assessment and Repair (RILEM Bookseries, Vol. 7)  G. Rossi-Manaresi, G. Alessandrini - Stone Decay and Conservation: Atmospheric Pollution, Cleaning, Consolidation and Protection:  N. Ashurst - Historic Building Materials:  ASTM Standarts  TS EN Standarts</p>



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<b>Institute</b>	<b>Graduate Education Institute</b>
<b>Department</b>	<b>Civil Engineering</b>
<b>Division/Program</b>	<b>Construction Management</b>

M. Sc. X		Ph.D. ...				
Course Code	Course Name	Semester (X)		Credit		
	Applications Of Quality Management Systems In Construction Industry	X	Fall	T	P	ECTS
		...	Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof.Dr. Mustafa Tolga ÇÖĞÜRCÜ	X Turkish ... English		X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	1	40
	Project	1	60
	Midterm Exam		
	Final Exam		

<b>Course Objectives and Goals</b>	Provide understanding the concept of quality management system standards in Construction and building field; and its applications in construction field. Establishing a quality management system in construction field in accordance with the ISO 9001:2000 and ISO 18001 quality management standards requirements.
<b>Course Content</b>	Description and diachronic of quality, quality assurance, quality in building, elements of quality in building, ISO 9001 Quality Management System Standard, ISO 18001 Quality Management System Standard, implementing ISO 9001 and ISO 18001 quality management system standards to a construction company, explicating standard in terms of building quality.
<b>Course Learning Outcomes</b>	1. Information about Quality, Quality Evaluation and Management 2. Information about Quality Standards 3. Information on Quality Criteria of Construction Projects 4. Information about Quality Management Systems and Their Establishment
<b>Recommended Resources</b>	ISO 9001: 2000 and ISO 18001 Quality Management System Standards, TSE Seminar notes,





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Institute	Graduate Education Institute
Department	Civil Engineering
Division/Program	Construction Management

M. Sc. X		Ph.D. ...			
Course Code	Course Name	Semester (X)	Credit		
	Earthquake Performance Evaluation And Analysis Of Masonry Buildings	... Fall	T	P	ECTS
		X Spring	3	0	5

Instructor(s) (Title, Name Surname)	Language(s) of Instruction (X)	Course Type (X)		Mode of Course (X)	
		Must	Elective	Face to face	Online
Prof.Dr. Mustafa Tolga ÇÖĞÜRCÜ	X Turkish ... English				
			X	X	

Assessment and Evaluation Methods			
	Evaluation Method	Number	Percentage (%)
	Laboratory		
	Quiz		
	Assignment	1	40
	Project	1	60
	Midterm Exam		
	Final Exam		

<b>Course Objectives and Goals</b>	Masonry buildings are building systems that keep their uncertainty in terms of earthquake performance and are engineer oriented compare to reinforced concrete and steel construction in terms of earthquake performance solution methods. This course will provide facilitation of evaluation and analysis of earthquake performances of existing and future masonry buildings by developing different computer programs in order to achieve to certain standards.
<b>Course Content</b>	Introduction and diachronic of masonry building. Introduction of masonry building materials and bonding systems and determining of their characteristics. Requirements of masonry buildings in catastrophe regulation. Performance analysis of existing buildings and development of an appropriate analysis program.
<b>Course Learning Outcomes</b>	Students will have detailed information about masonry structures. Students will learn the behavior and design of masonry structures under the influence of earthquakes. Students will have information about earthquake performance analysis of existing and newly constructed masonry structures

**Recommended Resources**

“Structural Masonry”, Hendry A.W., 1990, MacMillan Education Ltd.  
Hong Kong, “Masonry Walls: Materials And Construction” Hendry A.  
W. , 2018 Earthquake Regulation  
Relevant Law and Regulations, Lecture Notes