DEPARTMENT OF CIVIL ENGINEERING
COURSE SYLLABUS

MASTER PROGRAMME SYLLABUS

DEPARTMENT OF CIVIL ENGINEERING
COURSE SYLLABUS

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1.1. BAU501 - Unterirdische Bauwerke und Design

Course Details				
Code	**Academic Year**			**Semester**
BAU501	1			1
Title	**T**	**A**	**L**	**ECTS**
Underground Structures and Design	2	2	-	7

Language	Turkish					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	● Teaching basic aspects of the structural analysis and design in underground. ● Demonstration of various excavation methods as well as safety and auxiliary construction measures taking into account geological, static and constructional aspects. ● Geotechnical aspects of mechanical tunneling in soft ground or rock. ● Tunnel construction in the pressured and swellable rock. ● Consolidation of selected topics of underground construction as well as practicing the conceptual approach to complex problems. ● Deepening of special mountain pressure types and in selected topics of underground construction. ● Learning the conceptual approach to complex problems.					
Content	● Basics and applications of numerical methods in tunnel statics. ● Excavation methods (construction and operating methods) Safety and auxiliary construction measures: - Injections - Jet grouting - Freezing process - Drainage - Tube umbrellas - Chest anchor ● Mechanical tunneling in soft ground and rock ● Tunneling in squeezing rock and swelling rock ● Cavern construction: arrangement, construction methods, securing. ● Shaft construction in rock: construction methods, securing. ● Urban tunnel construction: boundary conditions, system choice, alignment, design and construction. ● Field measurements in rock and underground construction: measurement principles, planning, applications, interpretation. ● Opencast tunnel: static modeling, dimensioning.					
Prerequisites	-					
Coordinator						
Lecturer(s)	Assoc. Prof. Dr. Enver Vural YAVUZ					

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Assistant(s)	
Work Placement	
Recommended or Required Reading	
Books / Lecture Notes	[1] Kolymbas, D., (2005). Tunelling and Tunnel Mechanics. Springer Verlag, Berlin. [2] British Tunnelling Society, (2011). Monitoring Underground Construction. ICE Publishing. [3] Atkinson, J., (2014). Fundamentals of Ground Engineering. CRC Press, USA. [4] Small, J., C. (2016). Geomechanics in soil, rock and enwironmental engineering. CRC Press. [5] Goel, R. K., Singh, B., Zhao, J. (2012). Underground infrastructures : planning, design, and Construction. Elsevier/Butterworth-Heinemann. [6] Yun, B., (2019). Underground engineering : planning, design, construction and operation of the underground space. Academic Press of Elsevier.
Other Sources	-
Additional Course Material	
Documents	-
Assignments	-
Exams	-

Course Composition		
Mathematics und Basic Sciences		%
Engineering	50	%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences	50	%
Health Sciences		%
Expert Knowledge		%

Assessment		
Activity	**Count**	**Percentage (%)**
Midterm Exam	1	40
Quiz		
Assignments	2	10
Attendance		
Recitations		
Projects		
Final Exam	1	50
	Total	**100**

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ECTS Points and Work Load			
Activity	**Count**	**Duration**	**Work Load (Hours)**
Lectures	14	3	42
Self-Study	14	8	112
Assignments	2	12	24
Presentation / Seminar Preparation			
Midterm Exam	1	3	3
Recitations			
Laboratory			
Projects			
Final Exam	1	3	3
		Total Work Load	**184**
		ECTS Points (Total Work Load / Hour)	**7**

Learning Outcomes	
1	Teaching basic aspects of the structural analysis and design in underground.
2	Demonstration of various excavation methods as well as safety and auxiliary construction measures taking into account geological, static and constructional aspects.
3	Geotechnical aspects of mechanical tunneling in soft ground or rock.
4	Tunnel construction in the pressured and swellable rock.
5	Consolidation of selected topics of underground construction as well as practicing the conceptual approach to complex problems.
6	Deepening of special mountain pressure types and in selected topics of underground construction.
7	Learning the conceptual approach to complex problems.
8	
9	
10	
11	
12	

Weekly Content	
1	Basics and applications of numerical methods in tunnel statics.
2	Basics and applications of numerical methods in tunnel statics.
3	Excavation methods (construction and operating methods) Safety and auxiliary construction measures
4	Excavation methods (construction and operating methods) Safety and auxiliary construction measures
5	Excavation methods (construction and operating methods) Safety and auxiliary construction measures

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6	Excavation methods (construction and operating methods) Safety and auxiliary construction measures
7	Midterm I
8	Mechanical tunneling in soft ground and rock
9	Tunneling in squeezing rock and swelling rock
10	Cavern construction: arrangement, construction methods, securing.
11	Cavern construction: arrangement, construction methods, securing.
12	Shaft construction in rock: construction methods, securing.
13	Urban tunnel construction: boundary conditions, system choice, alignment, design and construction.
14	Field measurements in rock and underground construction: measurement principles, planning, applications, interpretation.
15	Opencast tunnel: static modeling, dimensioning.

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1	5	5	3	4	4	5	5
2	5	5	3	4	4	5	5
3	5	5	3	4	4	5	5
4	5	5	3	4	4	5	5
5	5	5	3	4	4	5	5
6	5	5	3	4	4	5	5
7							
8							
9							
10							
11							
12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
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Compiled by:	Recep Özkan
Date of Compilation:	14.11.2023

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1.2. BAU502 - Seminar

Course Details				
Code	**Academic Year**			**Semester**
BAU502	1			Spring
Title	**T**	**A**	**L**	**ECTS**
Seminar	-	2	-	9

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	To give students the ability to research and make a presentation on a specific subject					
Content	Scientific Presentation Principles, Determination of Thesis Topic, Sample Report Writing, Use of Resources.					
Prerequisites	--					
Coordinator	--					
Lecturer(s)	Assoc. Prof. Dr. Murat Hamderi					
Assistant(s)	--					
Work Placement	--					

Recommended or Required Reading	
Books / Lecture Notes	--
Other Sources	--

Additional Course Material	
Documents	--
Assignments	--
Exams	--

Course Composition		
Mathematics und Basic Sciences		%
Engineering	60	%
Engineering Design	10	%
Social Sciences	30	%
Educational Sciences		%

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Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam		
Quiz		
Assignments	5	30
Attendance		
Recitations	1	20
Projects		
Final Exam	1	50
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	2	28
Self-Study	14	10	140
Assignments	5	10	50
Presentation / Seminar Preparation	1	10	10
Midterm Exam			
Recitations	14	2	28
Laboratory			
Projects			
Final Exam	1	2	2
		Total Work Load	**258**
		ECTS Points (Total Work Load / Hour)	**9**

Learning Outcomes

1	Learning the processes and techniques of scientific research
2	Accessing publications, learning reporting information
3	Gaining the ability to make a presentation

Weekly Content

1	Determination of presentation topic
2	Self study
3	Self study

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4	Self study
5	Self study
6	Self study
7	Self study
8	Self study
9	Self study
10	Self study
11	Self study
12	Self study
13	Self study
14	Self study
15	Self study

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1	4	3	3	4	5	5	5
2	4	3	3	4	5	5	5
3	4	3	3	4	5	5	5

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
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Compiled by:	Recep Özkan
Date of Compilation:	01.06.2022

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1.3. BAU503 – Deep Foundations

Course Details				
Code	**Academic Year**			**Semester**
BAU503	1			Spring
Title	**T**	**A**	**L**	**ECTS**
Deep Foundations	2	2	-	7

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	Overview of pile types. Design issues. Bearing capacity under vertical load. Settlement. Soil-pile interaction. Pile testing. Pile behavior under horizontal load. Piled rafts. Energy piles.					
Content	1. Soil Classification and Phase Relationships 2. Elastic-Plastic Equilibrium, Active-Passive Soil Pressures 3. Rankine, Coulomb and some other Soil Theories 4. Sheet Pile Walls, Theory and Design 5. Deep Foundations, Theory and Design 6. Capacity of a Single Pile 7. Pile Capacity using On-site Pile Test Results 8. Introduction to Modelling of Piles in Finite Element Programs 9. Capacity of Pile Groups, Pile Group Efficiency 10. Behavior of Piles under Horizontal Loads 11. Cassion Foundations 12. Anchored Pile Walls					
Prerequisites	--					
Coordinator	--					
Lecturer(s)	Assoc. Prof. Murat HAMDERI					
Assistant(s)	Ozan Subaşı, Recep Özkan					
Work Placement	--					

Recommended or Required Reading	
Books / Lecture Notes	[1] Hamderi, M., (2019). New Approach to Pile Load Estimation, Int. J. of Geomechanics, American Society of Civil Engineers, Vol.19(4), pp. 1-14, USA [2] Hamderi, M., (2019). Footing Settlement Formula based on Multi-Variable Regression Analyses, Geomechanics and Engineering, Vol.17(1), pp. 11-18, S. Korea.

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	[3] Hamderi M. (2018). "A Comprehensive Group Pile Settlement Formula based on 3D Finite Element Analyses." Soils and Foundations, Japanese Geotechnical Society, 58(1), pp.1-15 [4] Braja M. Das, 2014. Principles of Geotechnical Engineering, 5th ed., PWS Publishing Company, Boston. [5] Budhu, M., 2010. Soil Mechanics and Foundations. 3rd ed. John Wiley & Sons Inc. [6] Bowles, J. E., (1997). Foundation Analysis and Design., McGraw-Hill Inc., 5th edition. [7] Reese, L.C., Van Impe W.F., Single Piles and Pile Groups under Lateral Loading 2nd Ed.
Other Sources	--

Additional Course Material	
Documents	--
Assignments	--
Exams	--

Course Composition		
Mathematics und Basic Sciences	40	%
Engineering	30	%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences	30	%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	30
Quiz		
Assignments	1	30
Attendance		
Recitations		
Projects		
Final Exam	1	40
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42

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Self-Study	14	10	140
Assignments	1	8	8
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations			
Laboratory			
Projects	1	16	16
Final Exam	1	2	2
		Total Work Load	**210**
		ECTS Points (Total Work Load / Hour)	**7**

Learning Outcomes	
1	The students are able to perform the stress analysis in soils and shear forces as well as bending and torsional moments on walls and foundations.
2	They know the relationships between friction angle and soil bearing capacity.
3	They are able to independently calculate the settlement of pile groups and other deep foundation types.
4	They know the relationships between settlement and pile length, pile spacing, vertical load and soil modulus.
5	Students are able to familiarize themselves independently with other areas of geotechnical engineering and to take the aspects of geotechnics into account in future projects.

Weekly Content	
1	Soil Classification and Phase Relationships
2	Elastic-Plastic Equilibrium, Active-Passive Soil Pressures
3	Rankine, Coulomb and some other Soil Theories
4	Sheet Pile Walls, Theory and Design
5	Deep Foundations, Theory and Design
6	Deep Foundations, Theory and Design
7	Deep Foundations, Theory and Design
8	**Midterm Exam**
9	Capacity of a Single Pile
10	Pile Capacity using On-site Pile Test Results
11	Anchored Pile Walls
12	Introduction to Modelling of Piles in Finite Element Programs
13	Capacity of Pile Groups, Pile Group Efficiency

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14	Behavior of Piles under Horizontal Loads
15	Cassion Foundations

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1	5	4	4				
2	5	4	4				
3	5	4	4				
4	5	4	4				
5	5	4	4				

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
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Compiled by:	Assoc. Prof. Murat Hamderi
Date of Compilation:	29.06.2022

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1.4. BAU504 - Clays in Geotechnological Use: Structures, Problems and Applications

Course Details				
Code	**Academic Year**			**Semester**
BAU504	1			2
Title	**T**	**A**	**L**	**ECTS**
Clays in Geotechnological Use: Structures, Problems and Applications	2	2	-	7

Language	Turkish					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	This course gives a comprehensive introduction in clay mineralogy, properties, characterising and testing methods as well as applied aspects and problems of clays and clay minerals in geotechnics. Upon successful completion of this course the student is able to: • Describe clay minerals and their fundamental properties • Describe/propose methods for characterisation of clays and clay minerals • Draw conclusion about specific properties of clays with a focus to their potential use, problematics and things to consider in geotechnics and engineering geology.					
Content	• Introduction to clays and clay minerals (importance and application in geosciences, industry and everyday life) • Origin of clays (formation of clays and clay minerals, geological origin) • Clay mineral structure, classification and identification incl. methods for investigation (e.g., XRD) • Properties of clay materials, characterisation and quantification incl. methods for investigation (e.g., cation exchange, rheology, plasticity, shearing, swelling, permeability, retardation and diffusion) • Clay Minerals in geotechnics: Stuctures, problems and applications (e.g. soil mechanics, barriers, slurry walls, tunnelling)					
Prerequisites	-					
Coordinator						
Lecturer(s)	Assoc. Prof. Dr. Enver Vural YAVUZ					
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	[1] Millot, G., (1970). Geology of clays. Springer Verlag, Wien. [2] Velde, B., (1995). Origin and Mineralogy of Clays. Springer Verlag, Berlin.

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	[3] Pusch, R. (2015). Bentonite Clay. CRC Press, USA. [4] Schröder, P. A., (2018). Clasy in the critical Zone. Cambridge Uni. Press.
Other Sources	-

Additional Course Material	
Documents	-
Assignments	-
Exams	-

Course Composition		
Mathematics und Basic Sciences		%
Engineering	50	%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences	50	%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	40
Quiz		
Assignments	2	10
Attendance		
Recitations		
Projects		
Final Exam	1	50
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	14	8	112
Assignments	2	7	14
Presentation / Seminar Preparation			
Midterm Exam	1	3	3
Recitations			
Laboratory			
Projects			

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Final Exam	1	3	3
		Total Work Load	**174**
		ECTS Points (Total Work Load / Hour)	**7**

Learning Outcomes	
1	Describe clay minerals and their fundamental properties
2	Describe/propose methods for characterisation of clays and clay minerals
3	Draw conclusion about specific properties of clays with a focus to their potential use, problematics and things to consider in geotechnics and engineering geology.
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10	
11	
12	

Weekly Content	
1	Introduction to clays and clay minerals
2	Origin of clays
3	Clay mineral structure, classification and identification incl. methods for investigation
4	Properties of clay materials, characterisation and quantification incl. methods for investigation
5	Clay Minerals in geotechnics: Stuctures, problems and applications
6	
7	
8	
9	
10	
11	
12	
13	
14	

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15							
Contribution of Learning Outcomes to Program Objectives (1-5)							
	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High						
Compiled by:							
Date of Compilation:							

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1.5. BAU505 – Computational Mechanics I

Course Details				
Code		**Academic Year**		**Semester**
BAU505		1		1
Title		**T**	**A**	**L**	**ECTS**
Computational Mechanics I		2	2	-	7

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	At the end of this course, students will be able to; • Understand the concepts of stress and strain in a three dimensional setting, • Apply various numerical techniques for the solution of differential equations in engineering • Use the Python programming language for the programming of the finite element method • Use interpolation techniques such as Lagrange, Hermitian and Spline interpolation • Analyse the stress distribution in structural frames using the finite element method					
Content	• Introduction to Vectors and Tensors • The Concepts of Stress and Strain • Interpolation Techniques • Numerical Integration • Finite Element Approximation • Analysis of Bars, Beams and Frames					
Prerequisites	-					
Coordinator						
Lecturer(s)	Dr. Celal Çakıroğlu					
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	[1] Hughes, T.J.R. (2000) Finite Element Method: Linear Static And Dynamic Finite Element Analysis (Dover Civil and Mechanical Engineering) 1st Edition
Other Sources	-
Additional Course Material	

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Documents	-	
Assignments	-	
Exams	-	
Course Composition		
Mathematics und Basic Sciences		%
Engineering	50	%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences	50	%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	50
Quiz		
Assignments		
Attendance		
Recitations		
Projects		
Final Exam	1	50
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	14	3	42
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	3	3
Recitations			
Laboratory			
Projects			
Final Exam	1	3	3
		Total Work Load	**90**
		ECTS Points (Total Work Load / Hour)	**7**

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Learning Outcomes	
1	Understanding the concepts of stress and strain in a three dimensional setting
2	The students will learn various numerical techniques for the solution of differential equations in engineering
3	The usage of the Python programming language for the programming of the finite element method
4	Familiarity with interpolation techniques such as Lagrange, Hermitian and Spline interpolation
5	The ability to analyse the stress distribution in structural frames using the finite element method
6	Learning numerical integration of functions of several variables
7	
8	
9	
10	
11	
12	
Weekly Content	
1	Vectors and Matrix Algebra
2	Linear Spaces
3	Linear elastic material behaviour
4	Nonlinear material behavior
5	Lagrange, Newton and Hermite Interpolation
6	Spline Interpolation
7	Numerical Integration of functions of a single variable
8	Midterm I
9	Numerical integration of functions of several variables
10	Finite Element Approximation
11	Analysis of Bars and Beams
12	Analysis of Frames
13	
14	
15	

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Contribution of Learning Outcomes to Program Objectives (1-5)							
	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	
Date of Compilation:	

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1.6. BAU506 – Computational Mechanics II

Course Details				
Code		**Academic Year**		**Semester**
BAU506		1		Spring
Title		**T**	**A**	**L**	**ECTS**
Computational Mechanics II		2	2	-	7

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	To teach the students major techniques of machine learning. Application of machine learning techniques to structural engineering problems. Beams on elastic foundation					
Content	• Beams on elastic foundation • Introduction to machine learning • Artificial neural networks • Classification with support vector machines • Decision trees					
Prerequisites	--					
Coordinator	--					
Lecturer(s)	Assist. Prof. Dr. Celal ÇAKIROĞLU					
Assistant(s)	--					
Work Placement	--					

Recommended or Required Reading	
Books / Lecture Notes	• McGuire, W., Gallagher, R. H., & Ziemian, R. D. (2000). Matrix Structural Analysis, John Wiley and Sons. Inc., New York. • Lecture notes will be provided by the lecturer.
Other Sources	--

Additional Course Material	
Documents	--
Assignments	--
Exams	--

Course Composition		
Mathematics und Basic Sciences	20	%
Engineering	60	%
Engineering Design	20	%

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Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	40
Quiz		
Assignments		
Attendance		
Recitations		
Projects		
Final Exam	1	60
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	13	2	26
Self-Study	20	7	140
Assignments	2	20	40
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations			
Laboratory			
Projects			
Final Exam	1	2	2
		Total Work Load	**210**
		ECTS Points (Total Work Load / Hour)	**7**

Learning Outcomes

1	Matrix methods in structural analysis
2	Diffential equations of structural engineering

Weekly Content

1	Beams on elastic foundation
2	Beams on elastic foundation

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3	Beams on elastic foundation
4	Beams on elastic foundation
5	Beams on elastic foundation
6	Beams on elastic foundation
7	Beams on elastic foundation
8	Midterm I
9	Matrix analysis of frame systems
10	Matrix analysis of frame systems
11	Matrix analysis of frame systems
12	Matrix analysis of frame systems
13	Matrix analysis of frame systems
14	Matrix analysis of frame systems
15	Matrix analysis of frame systems

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1	4	4	1	2	1	3	5
2	4	4	1	2	1	3	5

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
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Compiled by:	Assist. Prof. Dr. Celal ÇAKIROĞLU
Date of Compilation:	29.06.2022

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1.7. BAU507 – Earthquake Engineering

Course Details				
Code	**Academic Year**			**Semester**
BAU507	1			1
Title	**T**	**A**	**L**	**ECTS**
Earthquake Engineering	2	2	-	7

Language	Turkish					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	Determination of structural reactions of building models under the influence of earthquakes					
Content	This course covers the basic theory of structural dynamics, the design and evaluation of structural models under seismic excitation according to the 2018 Turkish Building Earthquake Code. After completing the course, the students will gain knowledge about undamped and damped Single-Degree-of-Freedom System (SDOF), Response of one-Degree-of-Freedom-System to harmonic Loading, Response spectra, free vibration of shear building and dynamic analysis of Plane and three- dimensional Frames. In addition, they will learn the basic concepts for the 2018 Turkish Building Earthquake Code.					
Prerequisites	-					
Coordinator						
Lecturer(s)	Assistant. Prof. Dr. Serdar ULUSOY					
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	[1] Chopra, A. K. (2017). Dynamics of structures. theory and applications to. Earthquake Engineering. [2] Paz, M. (2012). Structural dynamics: theory and computation. Springer Science & Business Media.
Other Sources	[3] 2018 Turkish Building Earthquake Code. [4] 2007 Turkish Buildings Earthquake Code

Additional Course Material	
Documents	-
Assignments	-
Exams	-

Course Composition		
Mathematics und Basic Sciences	20	%

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Engineering	30	%
Engineering Design	30	%
Social Sciences		%
Educational Sciences		%
Natural Sciences	20	%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam		
Quiz		
Assignments	2	40
Attendance		
Recitations		
Projects		
Final Exam	1	50
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	4	56
Self-Study	14	8	112
Assignments	4	6	30
Presentation / Seminar Preparation			
Midterm Exam			
Recitations			
Laboratory			
Projects			
Final Exam	1	2	2
		Total Work Load	**194**
		ECTS Points (Total Work Load / Hour)	**7**

Learning Outcomes

1	Ability to calculate the structural reactions of a single degree of freedom system under the influence of different dynamic loadings.
2	Ability to calculate the structural reactions of a multi degree of freedom system under the influence of different dynamic loadings.
3	Knowledge about 2018 and 2007 Turkish Building Earthquake Code.

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6	
Weekly Content	
1	Introduction
2	Free vibration of undamped Single-Degree-of-Freedom System
3	Free vibration of damped Single-Degree-of-Freedom System
4	Response of undamped Degree-of-Freedom-System to harmonic Loading
5	Response of damped Degree-of-Freedom-System to harmonic Loading
6	Response Spectra of SDOF system under earthquake effect
7	Response Spectra of SDOF system under earthquake effect
8	Midterm exam (Homework)
9	Basic concepts of 2007 Turkish Building Earthquake Code
10	Basic concepts of 2018 Turkish Building Earthquake Code
11	Free Vibration of Shear Building
12	Dynamic Analysis of Plane Frames
13	Dynamic Analysis of three- dimensional Frames
14	
15	

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1	5	5	-	-	4	5	5
2	5	5	-	-	4	5	5
3	5	5	-	-	4	5	5
4							
5							
6							
7							
8							
9							
10							
11							
12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High

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Compiled by:	Assistant. Prof. Dr. Serdar ULUSOY
Date of Compilation:	06.07.2022

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COURSE SYLLABUS

1.8. BAU508 – Ground Improvement Techniques

Course Details				
Code		**Academic Year**		**Semester**
BAU508		1		2
Title		**T**	**A**	**L**	**ECTS**
Ground Improvement Techniques		2	2	-	7

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	After successful completion of this module, students will; • gain the ability to identify various soil problems. • gain competence in properly devising alternative solutions to difficult soil problems and in evaluating their effectiveness before, during and after construction. • learn many different approaches to the ground improvment					
Content	• Introduction to Ground Improvement Techniques • Mechanical Improvement Techniques • Compaction • Hydraulic Improvement Techniques • Hydraulics of Wells • Design of Dewatering Systems (Excavations and Slopes) • Filtration, Drainage, and Seepage Control with Geosynthetics • Preloading and the Use of Vertical Drains • Physical and Chemical Improvement Techniques • Improvement by Admixtures • Grouting Techniques • Thermal Improvement Techniques • Ground Freezing • Soil Reinforcement					
Prerequisites	-					
Coordinator						
Lecturer(s)	Assoc. Prof. Dr. Murat HAMDERİ					
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	1.. Van Impe, W.F., (1989) Soil Improvement Techniques and Their Evolution, Balkema 2. Smoltczyk / Hilmer, Baugrundverbesserung 3. Donel, Bodeninjektionstechnik, Verlag Glückauf, 1990 4. F.G.Bell, Engineering Treatment of Soils, E&FN Spon, 1993

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	5. Idel, Injektionverfahren, Grundbautaschenbuch, Band 2, 6. Auflage, 2001.	
Other Sources	-	
Additional Course Material		
Documents	-	
Assignments	-	
Exams	-	
Course Composition		
Mathematics und Basic Sciences		%
Engineering	50	%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences	50	%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	30
Quiz		
Assignments	2	30
Attendance		
Recitations		
Projects		
Final Exam	1	40
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	14	8	112
Assignments	2	12	24
Presentation / Seminar Preparation			
Midterm Exam	1	3	3
Recitations			
Laboratory			
Projects			

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Final Exam	1	3	3
		Total Work Load	**184**
		ECTS Points (Total Work Load / Hour)	**7**

Learning Outcomes	
1	to gain the ability to identify various soil problems.
2	to gain competence in properly devising alternative solutions to difficult soil problems and in evaluating their effectiveness before, during and after construction.
3	to learn many different approaches to the ground improvment
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Weekly Content	
1	Introduction to Ground Improvement Techniques
2	Mechanical Improvement Techniques
3	Compaction
4	Hydraulic Improvement Techniques
5	Hydraulics of Wells
6	Design of Dewatering Systems (Excavations and Slopes)
7	Filtration, Drainage, and Seepage Control with Geosynthetics
8	Midterm I
9	Preloading and the Use of Vertical Drains
10	Physical and Chemical Improvement Techniques
11	Improvement by Admixtures
12	Grouting Techniques
13	Thermal Improvement Techniques
14	Ground Freezing

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15	Soil Reinforcement

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1							
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9							
10							
11							
12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	
Date of Compilation:	

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1.9. BAU509 - Probability and Statistics for Transportation Engineering

Course Details				
Code	**Academic Year**			**Semester**
BAU509	1			1
Title	**T**	**A**	**L**	**ECTS**
Probability and Statistics for Transportation Engineering	2	2	-	7

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	This course aims for students to understand the fundamentals of probability and statistics and its application in engineering.					
Content	Fundamentals of probability, discrete and continuous random variables, jointly distributed random varibles, basics of descriptive statistics, inductive statistics, point estimation, confidence intervals, hypothesis tests, paired t-Test, analysis of variance, regression, goodness of fit tests, nonparametric tests					
Prerequisites	-					
Coordinator						
Lecturer(s)	Dr. Ömer Faruk AYDIN					
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	Ang, Alfredo, and Wilson Tang. Probability Concepts in Engineering Planning and Design: Vol I - Basic Principles. New York, NY: John Wiley & Sons, 1975. ISBN: 047103200X.
Other Sources	

Additional Course Material	
Documents	-
Assignments	-
Exams	-

Course Composition		
Mathematics und Basic Sciences	70	%
Engineering	30	%
Engineering Design		%

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Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam		
Quiz		
Assignments	1	40
Attendance		
Recitations		
Projects		
Final Exam	1	60
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	14	3	42
Assignments	1	10	8
Presentation / Seminar Preparation			
Midterm Exam			
Recitations			
Laboratory			
Projects			
Final Exam	1	2	2
		Total Work Load	**96**
		ECTS Points (Total Work Load / Hour)	**7**

Learning Outcomes

1	Fundamentals of probability
2	Discrete and Continuous Probability Distributions, Random Variables, Random Variable Functions
3	Point Estimation, Confidence Intervals and Hypothesis Tests
4	Variance Analyses, Regression, Goodness of Fit Tests, Nonparametric Tests
5	

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12	
Weekly Content	
1	Fundamentals of Probability
2	Discrete and Continuous Variables
3	Discrete and Continuous Variables
4	Discrete and Continuous Variables
5	Jointly Distributed Random Variables
6	Jointly Distributed Random Variables
7	Descriptive Statistics
8	Point Estimation, Confidence Intervals
9	Point Estimation, Confidence Intervals
10	Hypothesis Tests
11	Hypothesis Tests, t-test
12	Variance Analysis, Regression Analysis
13	Goodness of Fit Test
14	Nonparametric Tests
15	Applications in Engineering

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1							
2							
3							
4							
5							
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7							
8							

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9							
10							
11							
12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	Dr. Ömer Faruk Aydın
Date of Compilation:	30.07.2021

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COURSE SYLLABUS

1.10. BAU510 – Designing with Geosynthetics

Course Details				
Code		**Academic Year**		**Semester**
BAU510		1		2
Title		**T**	**A**	**L**	**ECTS**
Designing with Geosynthetics		2	2	-	7

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	After successful completion of this module, students will; • have knowledge about geosynthetics and the use of geosynthetics. • gain competence in designing alternative solutions with geosynthetics					
Content	• Overview of Geosynthetics • Designing with Geotextiles • Designing with Geogrids • Designing with Geonets • Designing with Geomembranes • Geosynthetic Clay Liners • Designing with Geopipes • Designing with Geofoam • Designing with Geocomposites					
Prerequisites	-					
Coordinator						
Lecturer(s)	Assoc. Prof. Dr. Murat HAMDERİ					
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	Koerner, R. M. "Designing with Geosynthetics. Prentice Hall, Upper Saddle River." (2005).
Other Sources	-

Additional Course Material	
Documents	-
Assignments	-
Exams	-

Course Composition

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COURSE SYLLABUS

Mathematics und Basic Sciences		%
Engineering	50	%
Engineering Design	50	%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	30
Quiz		
Assignments	2	30
Attendance		
Recitations		
Projects		
Final Exam	1	40
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	14	8	112
Assignments	2	12	24
Presentation / Seminar Preparation			
Midterm Exam	1	3	3
Recitations			
Laboratory			
Projects			
Final Exam	1	3	3
		Total Work Load	**184**
		ECTS Points (Total Work Load / Hour)	**7**

Learning Outcomes

1	to have knowledge about geosynthetics and the use of geosynthetics.
2	to gain competence in designing alternative solutions with geosynthetics

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12	
Weekly Content	
1	Introduction to Designing with Geosynthetics
2	Overview of Geosynthetics
3	Designing with Geotextiles
4	Designing with Geotextiles
5	Designing with Geogrids
6	Designing with Geogrids
7	Designing with Geonets
8	Midterm I
9	Designing with Geonets
10	Designing with Geomembranes
11	Designing with Geomembranes
12	Geosynthetic Clay Liners
13	Designing with Geopipes
14	Designing with Geofoam
15	Designing with Geocomposites

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1							
2							
3							
4							

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5							
6							
7							
8							
9							
10							
11							
12							
Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High						
Compiled by:							
Date of Compilation:							

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1.11. BAU512 – Landslides and Slope Stability

Course Details							
Code				**Academic Year**			**Semester**
BAU512				1			2
Title				**T**	**A**	**L**	**ECTS**
Landslides and slope stability				2	2	-	7
Language	Turkish						
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**		
Department / Program	Civil Engineering						
Forms of Teaching and Learning	Formal						
Course Type	**Compulsory**		**Elective**	✓			
Objectives	At the end of this course, students will be able to; • Understand the key characteristics of landslides processes and mechanisms, • The nature of mechanisms which control landslide movement, • The significance of landslides in shaping landscapes and in generating risk, • Methods for landslide monitoring, management and mitigation, • Appreciate the importance of landslides in landscape evolution, • Classify relevant landslides hazard(s) and their physical characteristics, spatial and temporal characteristics, • Recognize current issues and recent developments for landslide management in different country settings, • Acquire the basics of the theory that are used to describe and model landslides identify the linkages between landslide hazards and their trigger factors such as storms, earthquakes, etc., • Elaborate a hazard map, identifying the elements at risks and perform a risk assessment after field observations, develop methods to cope and manage risk, including land-use planning in landslides-prone areas, early-warning system and structural and non-structural measuresdiscuss the risk management and policies at the local level and to create a safer life for people who are threatened by landslides, rockslides and other geotechnical natural disasters. • Standard-of-care analysis, design, and remediation of unstable slopes, landslides, rockfalls, earth retention, excavations, Topics such as rainfall-induced movements, slope risk assessment and LiDAR .						
Content	• Shear Strength, Stress States, and Water Pressures Fundamentals of shear strength, Measurements of strength, Laboratory tests and standards, In situ field tests of strength, Importance of Water and Pore Pressures in Slope Stability • Rock Slopes and Landslides Geologic materials and processes affecting landslides, Landslide mechanisms and climatic conditions, Subsurface characterization, Land use and risk, Analysis and mechanisms • Rock Mechanics and Rock Slope Investigations						

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	Methods to estimate shear strength of discontinuities, Rock slope failure modes and analysis, Rock slope investigation, Mapping, Geological engineering of rock slopes • Rock Slope and Landslide Investigations Rock slope remediation, Quarry slope • Soil Slopes, Excavations, and Cut Slopes Slope failures, movements, and processes - Triggering mechanisms - The 4 G's of slope stability: geometry, geology, hydrogeology and geotechnical • Slope Stability Analysis Mechanics of limit equilibrium, Slope stability analysis methods, Commonly used Methods of Slices, Selection of analysis method, Evolving Analysis methods. • Slope Stability Reporting Components and structure of comprehensive slope stability analysis, Slope stability reporting • Unsaturated Slopes Soil suction and the soil-water characteristic curve, Stress conditions in unsaturated slopes, Infinite slope stability under unsaturated seepage conditions, Case studies of rainfall-induced cut slopes. • Debris Flows Design methodologies, Debris flow barriers • Geosynthetic Use in Slopes and Embankments Reinforcement, Erosion control, Drainage, Landslide repair • Advancing Topics in Slope Engineering LiDAR and Photogrammetry for Slope Stability Assessment
Prerequisites	-
Coordinator	
Lecturer(s)	Assoc. Prof. Dr. Enver Vural YAVUZ
Assistant(s)	
Work Placement	
Recommended or Required Reading	
Books / Lecture Notes	[1] Pradhan, S.P., Vishal, V., Singh, T.N. (2019). Landslides: Theory, Practice and Modelling. Springer Verlag. [2] Kliche., Ch. A., (2019). Rock slope stability. Society for Mining, Metallurgy & Exploration. [3] Cheng, Y. M.; Lau, C. K (2014). Slope stability analysis and stabilization. CRC Press, USA. [4] Zijun C., Wang, Y., Dianqing L. (2017). Probabilistic Approaches for Geotechnical Site Characterization and Slope Stability Analysis. Springer Verlag.
Other Sources	-
Additional Course Material	
Documents	-
Assignments	-
Exams	-
Course Composition	
Mathematics und Basic Sciences	%

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Engineering	50	%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences	50	%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	40
Quiz		
Assignments	2	10
Attendance		
Recitations		
Projects		
Final Exam	1	50
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	14	9	126
Assignments	2	10	20
Presentation / Seminar Preparation			
Midterm Exam	1	3	3
Recitations			
Laboratory			
Projects			
Final Exam	1	3	3
		Total Work Load	**194**
		ECTS Points (Total Work Load / Hour)	**7**

Learning Outcomes

1	Understand the key characteristics of landslides processes and mechanisms
2	The nature of mechanisms which control landslide movement
3	The significance of landslides in shaping landscapes and in generating risk

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4	Methods for landslide monitoring, management and mitigation
5	Appreciate the importance of landslides in landscape evolution
6	Classify relevant landslides hazard(s) and their physical characteristics, spatial and temporal characteristics
7	Recognize current issues and recent developments for landslide management in different country settings
8	Acquire the basics of the theory that are used to describe and model landslides identify the linkages between landslide hazards and their trigger factors such as storms, earthquakes, etc.
9	Elaborate a hazard map, identifying the elements at risks and perform a risk assessment after field observations, develop methods to cope and manage risk, including land-use planning in landslides-prone areas, early-warning system and structural and non-structural measuresdiscuss the risk management and policies at the local level and to create a safer life for people who are threatened by landslides, rockslides and other geotechnical natural disasters
10	Standard-of-care analysis, design, and remediation of unstable slopes, landslides, rockfalls, earth retention, excavations, Topics such as rainfall-induced movements, slope risk assessment and LiDAR
11	
12	
Weekly Content	
1	Shear Strength, Stress States, and Water Pressures
2	Rock Slopes and Landslides
3	Rock Mechanics and Rock Slope Investigations
4	Rock Slope and Landslide Investigations
5	Soil Slopes, Excavations, and Cut Slopes
6	Slope Stability Analysis
7	Slope Stability Reporting
8	Midterm I
9	Unsaturated Slopes
10	Debris Flows
11	Geosynthetic Use in Slopes and Embankments
12	Advancing Topics in Slope Engineering
13	
14	
15	

Contribution of Learning Outcomes to Program Objectives (1-5)							
	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**

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7							
8							
9							
10							
11							
12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	
Date of Compilation:	

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COURSE SYLLABUS

1.12. BAU514 – Active Structural Control

Course Details				
Code	**Academic Year**			**Semester**
BAU514	1			2
Title	**T**	**A**	**L**	**ECTS**
Active Structural Control	2	2	-	7

Language	Turkish					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	This course covers the basic concepts of structural control such as passive, semi-active and active control. After completing the course, the students will understand the difference between passive and active structural control. They will gain knowledge about the proportional integral derivative (PID) controller and are able to optimize the parameter of PID controller in active controlled structures under earthquake records using metaheuristic algorithms.					
Content	1. Introduction to the structural control 2. Type of active structural control and Control techniques 3. Introduction to Metaheuristic Algorithms 4. The structural responses of active tendon controlled structures using Matlab 5. The effect of time delay and control limit on the active tendon controlled structures					
Prerequisites	-					
Coordinator						
Lecturer(s)	Assistant. Prof. Dr. Serdar ULUSOY					
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	[1] Ulusoy, S. (2019). Yapı-zemin etkileşimi içeren yapı modellerinin optimum aktif kontrolü (Doctoral dissertation, Lisansüstü Eğitim Enstitüsü). [2] Nigdeli, S. M. (2012). Yakın Fay Etkisi Altındaki Yapılarda Aktif Tendonlar İle Yanal Yer Değiştirme Ve Burulma Kontrolü (Doctoral dissertation, Fen Bilimleri Enstitüsü).
Other Sources	

Additional Course Material	
Documents	-
Assignments	-
Exams	-

Course Composition

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COURSE SYLLABUS

Mathematics und Basic Sciences	40	%
Engineering	30	%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences	30	%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	40
Quiz		
Assignments	1	10
Attendance		
Recitations		
Projects		
Final Exam	1	50
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	14	3	42
Assignments	1	8	8
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations			
Laboratory			
Projects			
Final Exam	1	2	2
		Total Work Load	**96**
		ECTS Points (Total Work Load / Hour)	**7**

Learning Outcomes

1	
2	

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12	
Weekly Content	
1	Introduction to the structural control
2	Type of active structural control and Control techniques
3	Introduction to Metaheuristic Algorithms
4	The structural responses of active tendon controlled structures using Matlab
5	The effect of time delay and control limit on the active tendon controlled structures
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13	
14	
15	

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1							
2							
3							
4							

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5							
6							
7							
8							
9							
10							
11							
12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	
Date of Compilation:	

DEPARTMENT OF CIVIL ENGINEERING
COURSE SYLLABUS

1.13. BAU516 - Introduction to Intelligent Transportation Systems

Course Details				
Code	**Academic Year**			**Semester**
BAU516	1			2
Title	**T**	**A**	**L**	**ECTS**
Introduction to Intelligent Transportation Systems	2	2	-	7

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	The purpose of this subject is to introduce students to the basic elements of intelligent transportation systems (ITS), focusing on technological, systems and institutional aspects.					
Content	Advanced traveler information systems; transportation network operations; commercial vehicle operations and intermodal freight; public transportation applications; ITS and regional strategic transportation planning, including regional architectures: ITS and changing transportation institutions, ITS and safety, ITS and security, ITS as a technology deployment program, research, development and business models, ITS and sustainable mobility, travel demand management, electronic toll collection, and ITS and road-pricing.					
Prerequisites	-					
Coordinator						
Lecturer(s)	Dr. Ömer Faruk AYDIN					
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	
Other Sources	

Additional Course Material	
Documents	-
Assignments	-
Exams	-

Course Composition		
Mathematics und Basic Sciences	30	%
Engineering	70	%

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Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam		
Quiz		
Assignments	1	40
Attendance		
Recitations		
Projects		
Final Exam	1	60
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	14	3	42
Assignments	1	10	8
Presentation / Seminar Preparation			
Midterm Exam			
Recitations			
Laboratory			
Projects			
Final Exam	1	2	2
		Total Work Load	**96**
		ECTS Points (Total Work Load / Hour)	**7**

Learning Outcomes

1	Introduction to ITS
2	Advanced Traveler Information Systems (ATIS)
3	Advanced Transportation Management Systems (ATMS)
4	Advanced Public Transportation Systems (APTS)

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Weekly Content	
1	Introduction to ITS
2	Introduction to ITS
3	Introduction to ITS
4	Advanced Traveler Information Systems (ATIS)
5	Advanced Traveler Information Systems (ATIS)
6	Advanced Traveler Information Systems (ATIS)
7	Advanced Transportation Management Systems (ATMS)
8	Advanced Transportation Management Systems (ATMS)
9	Advanced Public Transportation Systems (APTS)
10	Advanced Public Transportation Systems (APTS)
11	ITS Applications
12	ITS Applications
13	Vehicle Operations
14	Vehicle Operations
15	Applications in Engineering

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
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11							
12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	Dr. Ömer Faruk Aydın
Date of Compilation:	30.07.2021

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COURSE SYLLABUS

1.14. BAU517 – Engineering Mathematics

Course Details				
Code	**Academic Year**			**Semester**
BAU517	1			2
Title	**T**	**A**	**L**	**ECTS**
Engineering Mathematics	2	2	-	7

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	To learn the mathematics underlying machine learning					
Content	Linear algebra (summary), analytic geometry (summary), matrix decompositions, calculus of vectors and matrices, probability and distributions, continuous optimisation, central machine learning problems, linear regression, dimensionality reduction and PCA, density estimation and Gaussian mixture models					
Prerequisites	-					
Coordinator						
Lecturer(s)						
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	
Other Sources	Mathematics for Machine Learning; M.P. Deisenroth, A.A. Faisal, C.S. Ong, Cambridge University Press, 2020 (açık erişim: http://mml-book.com)

Additional Course Material	
Documents	-
Assignments	End-of-chapter exercises
Exams	-

Course Composition		
Mathematics und Basic Sciences	70	%
Engineering	15	%
Engineering Design		%
Social Sciences		%

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Educational Sciences		%
Natural Sciences	15	%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	40
Quiz		
Assignments		
Attendance		
Recitations		
Projects		
Final Exam	1	60
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	2	28
Self-Study	14	10	140
Assignments	5	5	25
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations	14	2	28
Laboratory			
Projects			
Final Exam	1	2	2
		Total Work Load	**225**
		ECTS Points (Total Work Load / Hour)	**7**

Learning Outcomes

1	Understanding analytical geometry in linear-algebraic notation
2	Acquaintance with matrix decomposition methods
3	Ability to calculate gradients of many-valued functions in many-dimensional parameter spaces
4	Ability to synthesise data obeying given probability distributions
5	Comprehension of basic optimisation techniques
6	Ability to construct probabilistic models and parameter inferences

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7	Understanding the mathematical background of basic techniques used in machine learning problems
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Weekly Content	
1	Linear algebra I
2	Linear algebra II
3	Analytical geometry I
4	Analytical geometry II
5	Matrix decompositions
6	Calculus of vectors and matrices
7	Probability and distributions I
8	Probability and distributions II
9	Continuous optimisation
10	Modelling data I
11	Modelling data II
12	Linear regression
13	Dimensionality reduction and principal component analysis (PCA)
14	Density estimation and Gaussian mixture models
15	

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1							
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10							
11							
12							
Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High						
Compiled by:							
Date of Compilation:							

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1.15. BAU518 - Scientific Research Techniques and Publication Ethics

Course Details				
Code	**Academic Year**			**Semester**
BAU518	1			1
Title	**T**	**A**	**L**	**ECTS**
Scientific Research Techniques and Publication Ethics	3	-	-	9

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**	✓	**Elective**			
Objectives	It is aimed to teach the graduate level students enrolled in TAU FBEprograms; In accordance with the ethical rules within the framework of national and international regulations, reviewing of any scientific research, academic activity, publication, declaration, article, thesis, report, etc.					
Content	The Concept of Publication Ethics, Basic Principles, Violations, Scientific Thought Method, Research Types and Data Collection Methods, Using Computer in Text Creation and Using Internet Resources.					
Prerequisites	-					
Coordinator						
Lecturer(s)						
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	Bilim Etiği İstanbul Üniversitesi Yayın No:5048 ISBN 978-975-404-906-0
Other Sources	

Additional Course Material	
Documents	-
Assignments	-
Exams	-

Course Composition		
Mathematics und Basic Sciences		%
Engineering	50	%
Engineering Design		%

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Social Sciences	10	%
Educational Sciences		%
Natural Sciences	40	%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	35
Quiz		
Assignments	5	15
Attendance		
Recitations		
Projects		
Final Exam	1	60
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	2	28
Self-Study	14	10	140
Assignments	5	5	25
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations	14	2	28
Laboratory			
Projects			
Final Exam	1	2	2
		Total Work Load	**225**
		ECTS Points (Total Work Load / Hour)	**9**

Learning Outcomes

1	Scientific Ethics
2	Scientific Research and Review of Publications
3	Scientific Presentation Techniques
4	
5	

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Weekly Content	
1	Basic definitions of ethics
2	General introduction into scientific databases
3	Reviewing process of graduate theses
4	Selection criteria of keywords
5	Google scholar
6	Scopus
7	Web of Knowledge-Web of Science
8	Plagiarism analysis programs
9	Examples of reviewing scientific publications-1
10	Examples of reviewing scientific publications-2
11	Examples of reviewing scientific publications-3
12	Presentation examples-1
13	Presentation examples-2
14	Presentation examples-3
15	

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
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10							
11							
12							
Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High						
Compiled by:							
Date of Compilation:							

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1.16. BAU550 - Offshore Geotechnics and Design of Foundations for Offshore Wind Turbines

Course Details				
Code	**Academic Year**			**Semester**
BAU550	1			2
Title	**T**	**A**	**L**	**ECTS**
Offshore Geotechnics and Design of Foundations for Offshore Wind Turbines	2	2	-	7

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	The module will be focused on the geotechnical aspects in offshore engineering, and designing of fixed-bottom foundation systems for offshore wind turbines (OWTs). After completing the module, the students will gain in-depth theoretical and practical knowledge on the geotechnical investigation methods and approaches for the design of OWT´s foundation systems. Students will acquire knowledge on the estimation methods of design soil parameters for OWTs. They will understand the soil-structure interaction phenomena (SSI) and recommended SSI models for the foundations of OWTs. They will gain knowledge on scour development and protection around the foundation systems. They will get knowledge on model and filed tests in order to understand the response of the foundations for OWTs. The will learn the approximations for the estimation of the behavior of foundation systems for OWTs under long-term cyclic loading. They are going to get information on design considerations of real offshore wind farm projects.					
Content	• The aspects of geotechnical engineering in offshore • Standards and guidelines for the design of foundations for OWTs • The geotechnical aspects of seafloor and marine soils • The implementation of soil testing in field and laboratory for the estimation of design soil parameters for OWTs • Design approaches of especially bottom-fixed foundation systems for OWTs in moderate and deep waters • Behavior of foundation systems for OWTs under monotonic, cyclic loading, and combined loading conditions • The approximations for the estimation of the behavior of foundation systems for OWTs under long-term cyclic loading • Model and field tests to understand the behavior of foundation systems for OWTs • Scour development and scour protection around the foundation of OWTs • Numerical methods for the estimation of the response of OWTs • To understand the soil-structure interaction phenomena (SSI) and SSI models for the foundations of OWTs • Case studies, applied real offshore wind farm projects					
Prerequisites	-					

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Coordinator	
Lecturer(s)	Assoc. Prof. Dr. Cihan Taylan Akdağ
Assistant(s)	
Work Placement	

Recommended or Required Reading	
Books / Lecture Notes	[1] Randolph, M. & Gourvenec, S. (2011). Offshore Geotechnical Engineering. USA: Spon Press [2] B. C. Gerwick (2007). Construction of Marine and Offshore Structures. USA: Taylor & Francis. [3] M. Tomlinson & J. Woodward (1997). Pile Design and Construction Practice. USA: Taylor & Francis. [4] Reese, L. C., & Van Impe, W. F. (2001). Single piles and pile groups under lateral loading. Rotterdam: A.A. Balkema.
Other Sources	-

Additional Course Material	
Documents	-
Assignments	-
Exams	-

Course Composition		
Mathematics und Basic Sciences		%
Engineering		%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

Assessment		
Activity	**Count**	**Percentage (%)**
Midterm Exam	1	40
Quiz		
Assignments	2	10
Attendance		
Recitations		
Projects		
Final Exam	1	50
	Total	**100**

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ECTS Points and Work Load			
Activity	**Count**	**Duration**	**Work Load (Hours)**
Lectures	14	3	42
Self-Study	14	8	112
Assignments	2	8	16
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations			
Laboratory			
Projects			
Final Exam	1	2	2
		Total Work Load	**174**
		ECTS Points (Total Work Load / Hour)	**7**

Learning Outcomes	
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Weekly Content	
1	The aspects of geotechnical engineering in offshore
2	Standards and guidelines for the design of foundations for OWTs
3	The geotechnical aspects of seafloor and marine soils
4	The implementation of soil testing in field and laboratory for the estimation of design soil parameters for OWTs
5	Design approaches of especially bottom-fixed foundation systems for OWTs in moderate and deep waters

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6	Behavior of foundation systems for OWTs under monotonic, cyclic loading, and combined loading conditions
7	The approximations for the estimation of the behavior of foundation systems for OWTs under long-term cyclic loading
8	Model and field tests to understand the behavior of foundation systems for OWTs
9	Scour development and scour protection around the foundation of OWTs
10	Numerical methods for the estimation of the response of OWTs
11	To understand the soil-structure interaction phenomena (SSI) and SSI models for the foundations of OWTs
12	Case studies, applied real offshore wind farm projects
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14	
15	

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
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11							
12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	
Date of Compilation:	

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1.17. BAU551 – Whole Life Cycle systems Analysis

Course Details				
Code		**Academic Year**		**Semester**
BAU551		1		1
Title		**T**	**A**	**L**	**ECTS**
Whole Life Cycle Systems Analysis		2	2	-	7

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	To design civil systems, engineers need to satisfy a number of technical conditions, but also need to optimize the use of economic and environmental resources over the system's lifetime. During this module students will learn methods for designing civil systems under consideration of their life-cycle resource usage and environmental impact. To this end, students will get familiar with selected mathematical-analytical methods for engineering cost, risk, and multi-criteria comparison. Further, students will acquire in-depth knowledge about advanced risk management methods to understand possible system failures that may occur during the life of a product as well as how to capture systems deterioration during the lifetime. Students will also learn how to apply these methods in interdisciplinary engineering efforts by exploring the applicability of the methods for supporting collective decision making towards minimizing lifecycle costs and more importantly the environmental impact. Moreover, they will learn to think on various scales and consider various aspects related to systems integration within the environment and the existing built assets. To ground the theoretical part of the module, students will gain practical hands-on experiences modelling complex civil systems with the discussed techniques and methods using a rich practical case study project.					
Content	- Life-cycle assessment - Life-cycle maintenance planning - Multi-objective optimization - Economic and environmental resource estimation - Risk assessment and risk modelling - Collective Decision Making - Integrated life-cycle assessment					
Prerequisites	-					
Coordinator						
Lecturer(s)	dr. Lucian-Constantin Ungureanu					
Assistant(s)						
Work Placement						
Recommended or Required Reading						

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Books / Lecture Notes		
Other Sources	-	
Additional Course Material		
Documents	-	
Assignments	-	
Exams	-	
Course Composition		
Mathematics und Basic Sciences		%
Engineering		%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam		
Quiz		
Assignments	10 reading assignments	30
Attendance		
Recitations		
Projects	3	70
Final Exam		
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	2	28
Self-Study			
Assignments	10	4	40
Presentation / Seminar Preparation			
Midterm Exam			
Recitations			
Laboratory			
Projects	14	8	112

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Final Exam			
		Total Work Load	**180**
		ECTS Points (Total Work Load / Hour)	**7**

Learning Outcomes	
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Weekly Content	
1	Introduction and Logistics, The ilities of Lifecycle
2	Markov Chain Modelling
3	Product Components and System Decomposition
4	Failure Probabilities and Fault Trees
5	Information Gathering
6	Value of Information
7	Life-Cycle Assessment
8	Maintenance Planing
9	Multi-Criteria Decision Making
10	Deterioration Modeling
11	Constraint Optimization
12	Multi-Criteria Optimization
13	
14	

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15	

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
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12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	
Date of Compilation:	

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1.18. BAU552 – Design of Cable Stayed Bridges

Course Details				
Code	**Academic Year**			**Semester**
BAU552	1			2
Title	**T**	**A**	**L**	**ECTS**
Design of Cable Stayed Bridges	2	2	-	7

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	The students are taught advanced bridge building topics. Bridge construction is one of the supreme disciplines of civil engineering, in which the planning of cable-stayed bridges, i.e. tension band, stay cable and suspension bridges, is dealt with here in particular. Manual calculation methods for calculating the internal forces and the preliminary dimensioning of cable-stayed bridges are taught in order to understand the load transfer on the one hand and to check the results of FEM calculations on the other. This also includes the detailed treatment of the theory of cable statics and cable dimensioning as a basis for assessment.					
Content	- Structure and geometry of a cable, cable statics and design - Design, construction and dimensioning of cable-stayed bridges; - Design of pedestrian bridges - Consideration of wind-induced vibrations (transverse vibrations, galloping, fluttering): calculation method - Stability criteria, constructive countermeasures - Discussion of new bridge types such as integral, extradosed and movable bridges					
Prerequisites	-					
Coordinator						
Lecturer(s)	Dr. Alex Hückler					
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	
Other Sources	-

Additional Course Material	
Documents	-
Assignments	-
Exams	-

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Course Composition		
Mathematics und Basic Sciences		%
Engineering		%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

Assessment		
Activity	**Count**	**Percentage (%)**
Midterm Exam		
Quiz		
Assignments		
Attendance		
Recitations		
Projects		
Final Exam		
	Total	**100**

ECTS Points and Work Load			
Activity	**Count**	**Duration**	**Work Load (Hours)**
Lectures			
Self-Study			
Assignments			
Presentation / Seminar Preparation			
Midterm Exam			
Recitations			
Laboratory			
Projects			
Final Exam			
		Total Work Load	**180**
		ECTS Points (Total Work Load / Hour)	**7**

Learning Outcomes	
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Weekly Content	
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Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1							
2							
3							

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12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	
Date of Compilation:	

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1.19. BAU553 - Risk Management for Structures Exposed to Hazards

Course Details				
Code	**Academic Year**			**Semester**
BAU553	1			Spring
Title	**T**	**A**	**L**	**ECTS**
Risk Management for Structures Exposed to Hazards	2	2	-	7

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	This lecture will give students a general overview of the risk management discipline					
Content	-Risk management -Risk Assessment Methods -Earthquake Response of Structures -Earthquake Loss Estimation Methods -Basic Fire Concept -Fire Loss Estimation Methods -Preparing a Risk Assessment Report					
Prerequisites	--					
Coordinator	--					
Lecturer(s)	Dr. Ceyhun Eren					
Assistant(s)	--					
Work Placement	--					

Recommended or Required Reading	
Books / Lecture Notes	--
Other Sources	Lecture notes, Turkey's Regulation for Fire Protection, Turkey's Seismic Design Code

Additional Course Material	
Documents	--
Assignments	--
Exams	--

Course Composition		
Mathematics und Basic Sciences		%
Engineering	40	%

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Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences	30	%
Health Sciences		%
Expert Knowledge	30	%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	30
Quiz		
Assignments		
Attendance		
Recitations		
Projects	1	30
Final Exam	1	40
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	2	28
Self-Study	14	6	84
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	3	3
Recitations	14	2	28
Laboratory			
Projects	14	4	56
Final Exam	1	3	3
		Total Work Load	**202**
		ECTS Points (Total Work Load / Hour)	**7**

Learning Outcomes

1	General knowledge of the Risk Management concept
2	Ability to use risk assessment methods
3	To be able to apply fire loss estimation methods
4	Ability to prepare a risk assessment report

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Weekly Content	
1	Risk Management & Insurance
2	Earthquake Exposure and Risk Assessment Methods
3	Earthquake Response of Structures (Basic Dynamics of Structures)
4	Earthquake Loss Estimation Methods (PML) & Earthquake Insurance
5	Risk Assessment of Nat Cat Exposures (Flood, Landslide, Snow Weight, etc.)
6	Risk Assessment of Man-made Cat Exposures (Fire, etc.)
7	1st Midterm
8	Basic Fire Concept & Eliminating Causes of Fire
9	Causes of Fire related with Occupancy Type & Prevention Methods
10	Combustibility of Construction Materials
11	Passive Fire Protection Methods & Fire Detection Systems
12	Fire Extinguishing Systems(Both manual and automatic systems)
13	Fire Loss Estimation Methods (PML & EML) and Real Fire Claim Examples
14	Risk Survey Visit (TBD)
15	Risk Assessment Report Preparation

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1	4	5	3	3	4	4	4
2	5	5	4	5	4	4	5
3	5	5	4	5	4	4	5
4	5	5	5	5	5	5	5
5							
6							
7							
8							

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9							
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11							
12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	Recep Özkan
Date of Compilation:	30.05.2022

DEPARTMENT OF CIVIL ENGINEERING
COURSE SYLLABUS

1.20. BAU591 – Specialized Field Topics I

Course Details				
Code	**Academic Year**			**Semester**
BAU591	2			1
Title	**T**	**A**	**L**	**ECTS**
Specialized Field Topics-I	3	0	-	6

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**	✓	**Elective**			
Objectives	To enable students to have information about the studies related to their field of study.					
Content	Research on various fields of study Report writing on various fields of study Presentations on various fields of study					
Prerequisites	-					
Coordinator						
Lecturer(s)						
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	
Other Sources	-

Additional Course Material	
Documents	-
Assignments	-
Exams	-

Course Composition		
Mathematics und Basic Sciences		%
Engineering	40	%
Engineering Design		%
Social Sciences	30	%

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Educational Sciences		%
Natural Sciences	30	%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam		
Quiz		
Assignments	2	20
Attendance		
Recitations		
Projects	1	30
Final Exam	1	50
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	14	7	98
Assignments	2	12	24
Presentation / Seminar Preparation			
Midterm Exam	1	3	3
Recitations			
Laboratory			
Projects			
Final Exam	1	3	3
		Total Work Load	**170**
		ECTS Points (Total Work Load / Hour)	**6**

Learning Outcomes

1	To enable students to have information about the studies related to their field of study.
2	
3	
4	
5	
6	

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7	
8	
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10	
11	
12	
Weekly Content	
1	Giving the topics related to the areas of specialization
2	Self study
3	Self study
4	Self study
5	Self study
6	Self study
7	Self study
8	Self study
9	Self study
10	Self study
11	Self study
12	Self study
13	Self study
14	Self study
15	Final exam

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

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11							
12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	
Date of Compilation:	

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1.21. BAU592 – Specialized Field Topics II

Course Details				
Code	**Academic Year**			**Semester**
BAU592	2			2
Title	**T**	**A**	**L**	**ECTS**
Specialized Field Topics-II	3	0	-	6

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**	✓	**Elective**			
Objectives	to provide students with the competence to conduct advanced research in their specialized field					
Content	Advanced research on various fields of study Report writing on various fields of study Presentations on various fields of study					
Prerequisites	-					
Coordinator						
Lecturer(s)						
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	
Other Sources	-

Additional Course Material	
Documents	-
Assignments	-
Exams	-

Course Composition		
Mathematics und Basic Sciences		%
Engineering	40	%
Engineering Design		%

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Social Sciences	30	%
Educational Sciences		%
Natural Sciences	30	%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam		
Quiz		
Assignments	2	20
Attendance		
Recitations		
Projects	1	30
Final Exam	1	50
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	14	7	98
Assignments	2	12	24
Presentation / Seminar Preparation			
Midterm Exam	1	3	3
Recitations			
Laboratory			
Projects			
Final Exam	1	3	3
		Total Work Load	**170**
		ECTS Points (Total Work Load / Hour)	**6**

Learning Outcomes

1	to provide students with the competence to conduct advanced research in their specialized field
2	
3	
4	
5	

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6	
7	
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12	
Weekly Content	
1	Giving the topics related to the areas of specialization
2	Self study
3	Self study
4	Self study
5	Self study
6	Self study
7	Self study
8	Self study
9	Self study
10	Self study
11	Self study
12	Self study
13	Self study
14	Self study
15	Final exam

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1							
2							
3							
4							
5							
6							
7							
8							

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9							
10							
11							
12							
Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High						
Compiled by:							
Date of Compilation:							

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1.22. BAU593 – Master Thesis

Course Details				
Code	**Academic Year**			**Semester**
BAU593	2			2
Title	**T**	**A**	**L**	**ECTS**
Master Thesis	-	1	-	24

Language	English					
Level	**Undergraduate**		**Graduate**	✓	**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**	✓	**Elective**			
Objectives	Students complete the thesis with their thesis advisor.					
Content	Determining the thesis topic and completing the thesis					
Prerequisites	-					
Coordinator						
Lecturer(s)						
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	
Other Sources	-

Additional Course Material	
Documents	-
Assignments	-
Exams	-

Course Composition		
Mathematics und Basic Sciences		%
Engineering	30	%
Engineering Design	20	%
Social Sciences		%
Educational Sciences		%

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Natural Sciences	30	%
Health Sciences		%
Expert Knowledge	20	%

Assessment

Activity	Count	Percentage (%)
Midterm Exam		
Quiz		
Assignments		
Attendance		
Recitations		
Projects	1	100
Final Exam		
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures			
Self-Study	14	14	196
Assignments			
Presentation / Seminar Preparation	14	5	90
Midterm Exam			
Recitations	14	1	14
Laboratory			
Projects	14	30	420
Final Exam			
		Total Work Load	**720**
		ECTS Points (Total Work Load / Hour)	**24**

Learning Outcomes

1	to complete the thesis with their thesis advisor.
2	
3	
4	
5	
6	
7	

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8	
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11	
12	
Weekly Content	
1	Determining the thesis topic
2	Self study
3	Self study
4	Self study
5	Self study
6	Self study
7	Self study
8	Self study
9	Self study
10	Self study
11	Self study
12	Self study
13	Self study
14	Self study
15	Presentation

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							

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12							
Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High						
Compiled by:							
Date of Compilation:							