



Меѓународен Универзитет Визион - International Vision University Universiteti
Ndërkombëtar Vizion - Uluslararası Vizyon Üniversitesi

Adres: Ul. Major C. Filiposki No.1, Gostivar – Kuzey Makedonya
tel: +389 42 222 325, www.vizyon.edu.mk, info@vizyon.edu.mk

SYLLABUS

COURSE NAME	COURSE CODE	SEMESTER	COURSE LOAD	ECTS
INFRASTRUCTURE DESIGN	CIV-3002	1	180	6

Prerequisite(s)	None
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Course Language	Macedonian, Turkish, English
Course Type	Required
Course Level	First Cycle
Course Lecturer	
Course Assistants	
Classroom	
Extra Curricular Office Hours and Location	Meeting: Consultancy:

Course Objectives	<p>To equip students with up-to-date and real-life information about tunneling techniques and technologies.</p> <p>To teach the calculation methods of bridges and to introduce the regulations about bridges.</p> <p>Examining the problems related to filling and excavations in civil engineering and gaining design principles</p>
Course Learning Outcomes	<ol style="list-style-type: none"> 1- Learns the technical and economic evaluation methods of various underground conditions for tunnel design. 2- Learns the methods of estimating various soil and rock parameters. 3- Learns tunneling technologies with current and real life examples. 4- Learn about the properties of tunnel boring machines. 5- Gain information about the planning and implementation of tunnel projects. 6- Students will be able to classify bridges. 7- Students will be able to calculate the design loads for bridges. 8- Students will be able to design the structural elements of a single span steel railway bridge or a single span reinforced concrete highway bridge. 9- Students will be able to make necessary investigations for bridges. 10- Students will have knowledge about behavior of bridges. 11- The student has sufficient knowledge of mathematics, science and related engineering disciplines; gain the ability to use theoretical and applied knowledge in these fields in complex engineering problems. 12- The student gains the ability to identify, define, formulate and solve complex engineering problems; for this purpose, will have the ability to choose and apply appropriate analysis and modeling methods. 13- The student is given information about the use and design of landfills in civil engineering.

	<p>14- The student is given information about the basic principles of the design of deep excavations and the problems related to excavations.</p> <p>15- Civil engineering student is brought into the field of Geotechnical Engineering.</p>
Course Contents	<p>Introduction / Tunnel and Geological Structure / Overview of Rock Engineering Properties of Soil and Its Environment / Geometric and Technical Properties of Tunnel Project / Tunneling Methods / Workplace Safety and Health in Tunnels / Calculation of Tunnel Project Costs.</p> <p>Classification of Bridges, Reinforced Concrete Bridge Elements, Cross-section, Boy-section and Plans of Girder Reinforced Concrete Bridges; Loads on Steel Railway Bridges; Material Characteristics, Technical Specification of Highway Bridges and Application Examples; Influence Lines; Improper Downloads; Investigation of Steel Railway Bridge; General Stress, Stability, Buckling, Deformation Investigations; PIGEAUD, WESTERGAARD Methods for Plaque Calculations, plaque calculation according to AASHTO; Open Deck Steel Railway Bridge, Cross Section, Length Section and Plan, Definition of Bridge Elements, Traverse Calculation, Longitudinal Calculation, Transverse Beam Calculation, Cantilever Plates, Solid Body Main Girder Calculation, Introduction to Load Distribution Methods for Girder Bridges Main Girder Calculation, COURBON Method, Courbon Method obtaining unfavorable loadings, AASHTO load distribution method, Main Girder Body Plate Wrinkle Calculation, Lateral Buckling Calculation, GUYON-MASSONET Method, Fasteners, Lase joint, Horizontal Wind Joint, Vertical Wind Joint, Lase Joint, Lattice Main Beams, Elastomer bearings.</p> <p>Soil Embankments, Usage areas, Design principles/ Properties of compaction and compacted soils, specifications/ Soil filling construction methods and control in the field/ Highway fillings/ Fillings, settlements and stability controls on soft soils/ Seepage and erosion problems in fillings, drainage measures, foundation and hull stability analyzes/ Earth pressures and design of supported systems/ /Deep excavations, open and supported excavations/ Ground movements from deep excavations and their effects on surrounding structures/ Instrumental observation and drainage measures in soil fills</p>

WEEKLY SUBJECTS AND RELATED PREPARATION STUDIES

Week	Subjects	Related Preparation
1	<p>Introduction: Geometric and technical features of tunnel projects, tunnel types and examples.</p> <p>Engineering geology in tunnel projects, drilling work intensity, general effects of geological/tectonic structure on the projects.</p> <p>Behavior of tunnel structures under loads, calculations related to stability analysis.</p>	Related Chapters of Course Sources
2	<p>Classification of soil and rock masses and stability problems in terms of base/ceiling</p> <p>Tunnel excavation methods: classical methods</p> <p>Tunnel excavation + shoring methods: Excavation by machine.</p>	Related Chapters of Course Sources
3	<p>Tunnel excavation and shoring methods: Excavation by machine</p> <p>Tunnel excavation and shoring methods: Examples and sample projects.</p> <p>Subsidence/deformation in tunnel excavations and its effects on buildings.</p> <p>Ventilation in tunnels.</p>	Related Chapters of Course Sources
4	<p>Ventilation in tunnels.</p> <p>Tunnel costing overview and project examples.</p> <p>Student presentations.</p> <p>Tunnel costing overview and project examples.</p>	Related Chapters of Course Sources
5	<p>Classification of Bridges, Reinforced Concrete Bridge Elements, Cross-section, Boy-section and Plans of Girder Reinforced Concrete Bridges</p> <p>Loads, Material Characteristics of Steel Railway Bridges</p> <p>Highways Bridges Technical Specification and Application Examples, Influence Lines, Unfavorable Loads</p>	Related Chapters of Course Sources
6	<p>Investigations Required on Steel Railway Bridge, General Stress, Stability, Buckling, Deformation Investigations</p> <p>For Plaque Calculation PIGEAUD, WESTERGAARD Methods</p> <p>Plaque Calculation According to AASHTO</p>	Related Chapters of Course Sources
7	Mid-term Exam	Related Chapters of Course Sources
8	<p>Open Deck Steel Railway Bridge, Cross Section, Length Section and Plan, Definition of Bridge Elements, Traverse Calculation, Longitudinal</p>	Related Chapters of Course Sources

	Calculation, Latitude Beam Calculation Console Plates	
9	Full Body Main Girder Calculation Introduction to Load Distribution Methods for Main Girder Calculation in Girder Bridges, COURBON Method, Obtaining unfavorable loads with Courbon Method Main Beam Body Plate Wrinkling Calculation, Lateral Buckling Calculation	Related Chapters of Course Sources
10	GUYON-MASSONET Method Fasteners, Lase Joint, Horizontal Wind Joint, Vertical Wind Joint, Lattice Main Beams Fasteners, Lase connection, Horizontal Wind Connection, Vertical Wind Connection, Truss Main beams	Related Chapters of Course Sources
11	Soil Fillings, Usage areas Design principles Properties of compaction and compacted soils, specifications Soil fill construction methods and control in the field, Highway fills Fillings, settlements and stability checks on soft soils	Related Chapters of Course Sources
12	Dam embankments, seepage and erosion problems Dam embankments, drainage measures, foundation and body stability analysis Earth pressures, open and supported excavations Design of supported excavations	Related Chapters of Course Sources
13	Stability in deep excavations Prestress Anchor support systems Ground Nail support systems	Related Chapters of Course Sources
14	Deformation in deep excavations and its effect on surrounding structures Instrumental observation and drainage measures in landfills	Related Chapters of Course Sources
15	Final Exam	Related Chapters of Course Sources

ECTS / WORKLOAD TABLE

Presentation / Seminar			
Hours for off-the-classroom study (Pre-study, practice)	14	3	42
Midterm Exam	1	12	12
Final examination	1	14	14
Total Work Load			
ECTS		6	

GENERAL PRINCIPLE RELATED WITH COURSE

<p>Dear students,</p> <p>In order to be included, learn and achieve full success that you deserve in the courses you need to come well prepared by reading the basic and secondary textbooks. We are expecting from you carefully to obey to the course hours, not to interrupt the lessons unless is very indispensable, to be an active participant on the courses, easily to communicate with the other professor and classmates, and to be interactive by participating to the class discussions. In case of unethical behavior both in courses or on exams, will be acting in framework of the relevant regulations. The attendance of the students will be checked in the beginning, in the middle or at the end of the lessons. Throughout the semester the students who attend to all lectures will be given 15 activity-attendance points in addition to their exam grades.</p>
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SOURCES

COMPULSORY LITERATURE		
No	Name of the book	Author's Name, Publishing House, Publication Year
1	Kaya Mekaniği Ders Notları	İ.T.Ü. Maden Mühendisliği Bölümü, 1995. Arioğlu, Ergin
2	Tüneller, Ders Notları	2. Baskı, İTÜ İnşaat Fakültesi Ders Notları, İTÜ İnşaat Fakültesi Matbaası, 1987 Bozkurt, M.
3	İnşaat ve Maden Mühendisleri için Uygulamalı Kazı Mekaniği	Birsen Yayınevi, 1989. Bilgin, N.

ADDITIONAL LITERATURE		
No	Name of the book	Author's Name, Publishing House, Publication Year
1	Japanese Standard for Mountain Tunneling, The Fifth Edition	Japan Society of Civil Engineers, Tokyo, 1996. JSCE
2	Kaya Mekaniği Laboratuar Deneyleri	Ulusay, R., Gökçeoğlu, C., Binal, A.,
3	Çözümlü Problemlerle Tünel/Galerilerin Sismik Analizi	TMMOB Maden Mühendisleri Odası, İstanbul, 2006. Arioğlu, Ergin, Yılmaz, A. O.

EVALUATION SYSTEM

Underlying the Assessment Studies	NUMBER	PERCENTAGE OF GRADE
Attendance/Participation	15	%10
Project / Event	1	%20
Mid-Term Exam	1	%35
Final Exam	1	%35
TOTAL	17	%100

ETHICAL CODE OF THE UNIVERSITY

In case of the students are cheating or attempt to cheat on exams, and in the case of not to reference the sources used in seminar studies, assignments, projects and presentations, in accordance to the legislations of the Ministry of Education and Science of Republic of Macedonia and International Vision University, will be applied the relevant disciplinary rules. International Vision University students are expected never to attempt to this kind of behavior.