



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

Adres: Ul. Major C. Filiposki No.1, Gostivar – Makedonya  
 tel: +389 42 222 325, [www.vizyon.edu.mk](http://www.vizyon.edu.mk), [info@vizyon.edu.mk](mailto:info@vizyon.edu.mk)

### SYLLABUS

COURSE NAME	COURSE CODE	SEMESTER	COURSE LOAD	ECTS
CONCRETE AND REINFORCED CONCRETE STRUCTURES	3029	5	180	6

<b>Prerequisite(s)</b>	None
------------------------	------

<b>Course Language</b>	Turkish
<b>Course Type</b>	Elective
<b>Course Level</b>	First Cycle
<b>Course Lecturer</b>	
<b>Course Assistants</b>	
<b>Classroom</b>	
<b>Extra Curricular Office Hours and Location</b>	<b>Meeting:</b> <b>Consultancy:</b>

<b>Course Objectives</b>	The aim of this course is to provide the students with knowledge about physical and mechanical properties of concrete and its components; fundamentals of reinforced concrete design, the behavior of reinforced concrete, explaining the structural (flexural and shear) design of beams (simply reinforced, double-reinforced and T- beams in pure bending) and columns (axially and eccentrically loaded) and also to associate and integrate these concepts with architectural design applications.
<b>Course Learning Outcomes</b>	<ul style="list-style-type: none"> <li>• Understanding properties and structural behavior of concrete and reinforced concrete</li> <li>• Learning the design and analysis methods of reinforced concrete structural elements</li> <li>• Realizing advantages and disadvantages of reinforced concrete structures for architectural design</li> <li>• Using given knowledge effectively and practically in designing and dimensioning of reinforced concrete elements by considering code provisions</li> <li>• Producing appropriate solutions with regarding to architectural design and characteristics of structural systems</li> </ul>
<b>Course Contents</b>	Introduction, Concrete and steel, Loads and loads effects, Structural systems, Structural irregularities, Slabs, Beams, Columns, Footings

## WEEKLY SUBJECTS AND RELATED PREPARATION STUDIES

Week	Subjects	Related Preparation
1	Concrete: Introduction, historical background, definitions and fundamental concepts, component properties, aggregate, cement, water. Introduction of physical and mechanical properties of concrete. Time-variant deformations of concrete: Shrinkage and creep. Bond. Reinforcing steel and its mechanical properties	Related Chapters of Course Sources
2	Reinforced concrete: Definitions. Fundamental principles and methods in design. Material and load factors. Load combinations. Structural safety. Analysis of axially loaded columns. Behavior of tied and spiral columns. Short column concept	Related Chapters of Course Sources
3	Ultimate load capacity of tied and spiral columns. Code provisions related with dimensions and reinforcement of columns. Numerical examples	Related Chapters of Course Sources
4	Simple (pure) bending of beams. Introduction, basic concepts and assumptions. Behavior of a beam under increasing bending moment. Failure types: Under-reinforced beam (tension failure), balanced beam (balanced failure) and over-reinforced beam (compression failure)	Related Chapters of Course Sources
5	Simply reinforced rectangular beams. Ultimate Load Capacity Design and analysis. Derivation of equations related with ultimate capacity of simply reinforced rectangular beams. Numerical examples	Related Chapters of Course Sources
6	Analysis and design of double-reinforced beams. Derivation of equations related with ultimate capacity of double - reinforced rectangular beams. Numerical examples	Related Chapters of Course Sources
7	Mid-term Exam	Related Chapters of Course Sources
8	T- beams: Introduction, definitions and basic concepts. Analysis and design of T-beams. Numerical examples	Related Chapters of Course Sources
9	Eccentrically loaded columns: Introduction and basic concepts. Eccentricity, slenderness and short column concepts. Ultimate capacity of eccentrically loaded rectangular columns. Balanced failure state. Numerical examples	Related Chapters of Course Sources
10	Ultimate capacity of eccentrically loaded rectangular columns: States of tension and compression failures. Numerical examples. Nondimensional interaction diagrams: Concept, description and properties. Numerical examples	Related Chapters of Course Sources

<b>11</b>	Shear effect in beams: Introduction, diagonal tension and shearing capacity concepts. Types of shear reinforcement. Calculation of ultimate capacity of a beam with shear reinforcement. Numerical examples.	Related Chapters of Course Sources
<b>12</b>	According to the design of shear beam. Shear reinforcement calculation and constructive reinforcement. Numerical applications.	Related Chapters of Course Sources
<b>13</b>	Reinforced Concrete Slab Systems	Related Chapters of Course Sources
<b>14</b>	Foundations: code requirements, behaviors of foundations for different soil conditions	Related Chapters of Course Sources
<b>15</b>	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
<b>Total Work Load</b>			
<b>ECTS</b>		<b>6</b>	

**GENERAL PRINCIPLE RELATED WITH COURSE**

Dear students,

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.

**SOURCES****COMPULSORY LITERATURE**

No	Name of the book	Author's Name, Publishing House, Publication Year
1	Betonarme I -Ayrıntılı Örnekleriyle	Orbay, A., Birsen Yayınevi, İstanbul, 2005
2	Reinforced Concrete Structures	Park, R.,Paulay, T., Wiley, 1975
3		

**ADDITIONAL LITERATURE**

No	Name of the book	Author's Name, Publishing House, Publication Year
1	Betonarme Yapıların Hesap ve Tasarımı	Doğangün A, Birsen Yayınevi, 2009
2	Reinforced Concrete Fundamentals	Ferguson, P.M., Breen, J.E., Jirsa, J.O., Wiley, 1988
3	Г.Мијоски	Скрипта:Инфраструктурни објекти - основи ФПТН, 2011

## **EVALUATION SYSTEM**

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

## **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.