General information

For ED	Bachelor		
Knowledge area	19 "Architecture and construction"		
Speciality	192 " Building and en	gineering of the city"	
Specialization	-		
Characteristics of the discipline			
Туре	Obligatory		
language of teaching	English		
Total number of hours	150		
Number of credits ECTS	5		
Number of thematic	4		
modules			
Form of control	Credit /examination		
Indicators of the discipline for daily learning			
Year of study (course)	2, 3		
Semester	4	5	
Lectures	30 hours.	30 hours.	
Practical, seminar classes	30 hours.	30 hours.	
Independent study	15 hours.	15 hours.	

Teacher



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DESCRIPTION OF COURSE

The educational discipline "Structural Mechanics" is aimed at students' study of the issues of calculation of complex structures for strength, stiffness and stability, without a deep understanding of which it is impossible to fully prepare bachelors for the design of modern rural structures. The course deals with the calculation of composite structures for moving loads.

The purpose of the discipline is the general technical training of a specialist in the branch of construction, as well as the acquisition of skills in Theoretical and Structural Mechanics and the establishment of a base for studying the disciplines: "Metal structures", "Reinforced concrete structures", "Dynamics of bases and foundations".

Prerequisites for studying the course. Studying of the discipline assumes that you have knowledge of mathematics, physics, theoretical mechanics and mechanics of materials and constructions.

Competencies of the educational programme:

Integral competence (IC): IC The ability to solve complex specialized construction and civil engineering tasks in the learning process, which involves the application of a complex of theories and methods for determining the strength, stability, deformability, modeling, strengthening of building structures; further safe operation, reconstruction, construction and installation of buildings and engineering structures; application of automated design systems in the field of construction.

General competencies (GC): GC 01. Ability to learn and master modern knowledge.

Gc 02. Knowledge and understanding of the subject area, professional understanding activities of the construction industry.

Gc 6. Ability to apply knowledge in practical situations.

Gc 7. Ability to evaluate and ensure the quality of work performed.

Professional (special) competencies (PC):

Discipline provides a number of competencies

PC1. Ability to use conceptual scientific and practical knowledge in mathematics, chemistry and physics to solve complex practical problems in the field of construction and civil engineering.

PC4. Ability to choose and use appropriate equipment, materials, tools and methods for designing and implementing technological processes of construction production.

SC7. Ability to take responsibility for making and making decisions in the field of architecture and construction in unpredictable work contexts

Program learning outcomes (PLO) of the educational programme:

Expected Learning Outcomes (ELO):

PLO1. Apply basic theories, methods and principles of mathematical, natural, social, humanitarian and economic sciences, modern models, methods and decision support software to solve complex construction and civil engineering problems.

PLO2. Participate in research and development in the field of architecture and construction.

PLO3. Design and implement technological processes of construction production, using appropriate equipment, materials, tools and methods.

PLO7. Collect, interpret and apply data, including through the search, processing and analysis of information from various sources.

Торіс	Hours	Learning	Tasks	Estimation,
	practical, seminars)	outcomes		units
	•	4 semester		
Module 1. The calculation of complex beam				40
Theme 1. The		Student		
quantitative stage of	2/2	should be know		5
kinematic analysis		the basic of		5
of flat systems		calculation of		
Theme 2. The		complex beams		
structural analysis	$\gamma \gamma \gamma$	Student		5
of complex		should be able to		5
structures		build the		
Theme 3.		diagrams of		
Calculation of	2/2/	internal forces		5
simple beam		and for complex		
Theme 4. The		beams.	Submitting a	
kinetic analysis of	2/2/2	To analyze the	workshop.	5
complex beam		diagrams of	Completing tests.	
Theme 5. Static		internal forces	Writing independent	
calculation of	2/2/4	and for complex	works. Self-study	5
composite beams		beams.	(Performing practice	
Theme 6. The		To understand	and independent	
construction of		the diagrams of	work in "Elearn").	
lines of influence of		internal forces	Problem solving, of	
support reactions	2/2/	and for complex	structural mechanics	5
for statically		beams.	theory.	
indeterminate		To distinguish		
beams		between types of		
Theme 7. The		of the diagrams		
construction of the		of internal forces		
influence line of the	2/2/	and for complex		5
bending moment	21 21	beams.		5
for a simple		To apply		
supported beam		different types of		
Theme 8. The		the diagrams of		
construction of the	2/2/	internal forces		5
influence line of the		and for complex		

THE STRUCTURE OF DISCIPLINE

shearing force for a		beams in		
simple supported		buildings.		
beam		C C		
	Module 2. The cal	culation of trusses		30
Theme 1. The				
construction of the		Student		
influence line of	2/2/	should be know		4
internal efforts for		the basic of		
the cantilever beam		calculation of		
Theme 2. The		trusses		
construction of		Student		
influence lines of		should be able to		
internal efforts for	2/2/	determinete the		4
complex by general		internal afforts of	Submitting	
mothed		internal efforts of	Submitting a	
Themes 2 The		truss by different	workshop.	
I neme 3. The		methods.	Completing tests.	
construction of		To analyze the	Writing independent	
influence lines of		result of	works. Self-study	
internal efforts for	2/2/	calculation of	(Performing practice	4
complex beams by		trusses.	and independent	
the kinematic		To understand	work in "Elearn").	
method.		the basis of truss	Problem solving, of	
Theme 4. The	2/2/2	calculation.	structural mechanics	5
method of joints.		To distinguish	theory.	5
Theme 5. The		between types of		5
method of sections		truss loads.		5
Theme 6. The		To apply		
method of	2/2/1	different method		4
compatible sections		of truss		
Theme 7. The		calculation in		
calculation of flat	2/2/2	buildings.		
trusses under snow	2/2/2			4
load				
Total for 4				
semester	30/30/15	-	-	70
	Cr	edit		30
	 Total for	<u>4</u> semester		100
	10101101	4 Semester		100
	5 sen	nester		
	Module 3 The c	alculation of arch		40
Thoma 1 Tha		Student		40
definition of		Student		
definition of	2/2/1	should be know		5
support reaction of		the basic of	Submitting a	
simple arch.		calculation of	workshop.	
Theme 2. The		complex archs.	Completing tests.	
construction of		Student	Self-study	_
diagram of normal	2/2/1	should be able to	(Performing practice	5
force for simple		build the	and in "Elearn")	
arch.		diagrams of	Problem solving of	
Theme 3. The		internal forces	structural mechanice	
construction of		and for complex	theory	
diagram of shear	2/2/1	archs.	uicory.	5
force for simple		To analyze the		
arch.		diagrams of		

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	of deflections		frames.		

Theme 6. Stability of buildings. The basis of calculation of structures by the method of limit states	2/2/1	To distinguish between types of of the diagrams of internal forces and for complex frames.		4
Theme 7. Stability of buildings.Methodof deflections.	2/2/1	To apply different types of the diagrams of internal forces and for complex frames in buildings.		4
Total for 4 semester	30/30/15	-	-	70
Exam			30	
Total for course			100	

EVALUATION POLICY

Policy	Assignments submitted after the deadline without valid reasons will be graded
regarding	lower. Resitting of modules will be allowed with the permission from the
deadlines and	lecturer and in the presence of valid reasons (e.g. medical reasons)
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Academic	Cheating during tests and exams is strictly prohibited (including the use of
honesty policy:	mobile devices). Coursework and research papers must contain correct citations
	for all sources used.
Attendance	Class attendance is mandatory. In case of objective reasons (such as illness or
policy:	international internships), individual learning may be allowed (in online format
	by the approval of the dean of the faculty).

SCALE OF ASSESSMENT OF STUDENT KNOWLEDGE

Student rating,	National grade based on exam results		
points	exams	credits	
90-100	excellent	passed	
74-89	good		
60-73	satisfactory		
0-59	unsatisfactory	not passed	

RECOMMENDED SOURCES OF INFORMATION

1. A. Kutsenko. Structural Mechanics: Part I. Manual. Kyiv. 2022 – 184 p.

2. A. Kutsenko. Structural Mechanics: the calculations of complex arches and frames. Part II. Manual. Kyiv. 2023 – 250 p.

3. Alberto Carpinteri Structural Mechanics: a unified approach. Taylor & Francis Ltd | CRC Press, 2019. 780 p.

4. M.M. Bakhoum Structural Mechanics. Structural Engineering Dept., Faculty of Engineering, Cairo University, 2nd Print, 2010. 1438 p.

5. Sachin M. Pore, Uttam R. Awari, Jyoti P. Bhusari Structural Mechanics – II. Nirali Prakashan, 2020. 201 p.

6. Video materials for lectures https://www.youtube.com/