



СИЛАБУС ДИСЦИПЛІНИ
«Mechanics of materials and constructions»

Ступінь вищої освіти - **Bachelor**
 Спеціальність - **133 "Sectoral mechanical engineering"**
 Освітня програма - **«Bachelor»**
 Рік навчання – 2, семестр – 3, 4
 Форма навчання – **daily learning**
 Кількість кредитів ЄКТС – 7
 Мова викладання – **English**

Лектор курсу
Контактна інформація
лектора (e-mail)
Сторінка курсу в eLearn

A. Kutsenko

kutsenko@nubip.edu.ua
https://elearn.nubip.edu.ua/course/view.php?id=2068

ОПИС ДИСЦИПЛІНИ

(до 1000 друкованих знаків)

Mechanics of materials and construction is a basic engineering subject that must be understood by anyone concerned with the strength and physical performance of structures, whether those structures are man-made or natural. The subject matter includes such fundamental concepts as stresses and strains, deformations and displacements, elasticity and inelasticity, strain energy, and load-carrying capacity. These concepts underlie the design and analysis of a huge variety of mechanical and structural systems.

The teacher main aims to help students taking courses taught in English at National University of life and environmental sciences of Ukraine, Faculty of Design and Engineering, in their studies of one of the most important and most difficult engineering topic.

THE STRUCTURE OF DISCIPLINE

Title of thematic modules and themes	Hours (Lectures / Laboratory lessons/ Independent study)	Training facts	Tasks	Estimation, units
3 semester				
The thematic module 1. TENSION AND COMPRESSION				20
Theme 1. Purpose and objectives of the course. The basic hypotheses and the definitions of the mechanics of materials and constructions	2/0/0	Student should be know: the basic hypotheses and the definitions of the mechanics of materials and constructions	Delivery of practicaly and laboratory works. Execution of independent works.	
Theme 2. The relation among internal forces and tensions in case of tension or compression of the bar.	2/2/2	Student should be able to: built the diagrams of internal forces and tensions in case of tension or compression of the bar.		4
Theme 3. The method of calculating the bar on strength	2/2/2			4

Theme 4. The method of calculating the bar on rigidity	2/0/2			4
Theme 5. The calculation of bar on strength with in terms of weight and temperature.	2/2/0			4
Theme 6. The calculation of statically indeterminate bars.	2/2/2			4
The thematic module 2. TORSION				30
Theme 1. The geometric characterizations of the plane cross sections.	5/4/4	<p>Student should be know: the main geometric characterizations of the plane cross sections; the relation among internal forces and tensions in cases of direct shear and torsion.</p> <p>Student should be able to: built the diagrams of internal forces and tensions in case of torsion of the bar.</p>	<p>Delivery of practically and laboratory works. Execution of independent works.</p>	10
Theme 2. Analysis of Stress and Strain	4/2/2			2
Theme 3. The direct shear stresses.	2/2/2			5
Theme 4. The definition of torsion.	2/0/2			5
Theme 5. The method of calculating the bar on strength and rigidity by torsion	2/2/0			8
The thematic module 3. BEAM BENDING				20
Theme 1. The equation of Shearing force for the cantilever and simple beams	2/2/2	<p>Student should be know: the equations of bending moment and shearing force for the cantilever and simple beams.</p> <p>Student should be able to: built the diagrams of internal forces and tensions in case of bending of the beam</p>	<p>Delivery of practically and laboratory works. Execution of independent works.</p>	2
Theme 2. The equation of Bending moment for the cantilever and simple beams.	2/2/0			2
Theme 3. The calculation method cantilever beam on the strength by the normal stresses	2/0/2			6
Theme 4. The calculation method simple beam on the strength by the normal stresses.	2/2/2			4
Theme 5. The calculation of a curvated beam	5/2/2			2
Theme 6. Double – integration method.	2/2/2			2
Theme 7.	2/2/2			2

Verescagin's rule.				
Total for 3 semester	45/30/30	-	-	70
Test				30
Total for 3 semester				100
4 semester				
The thematic module 4. METHODS OF DEFINITION OF BEAM SYSTEMS DEFORMATIONS				40
Theme 1. Castigliano's theorem.	2/4/2	<p style="text-align: center;">Student should be know: the basis methods for definition the deformations of beam and frame. The definitions of the statically indeterminate constructions; the three moment's theorem</p> <p style="text-align: center;">Student should be able to: define the deformations of beam and frame by different methods; applicate methods of definitions of the deformations for statically indeterminate beam and frame.</p>	Delivery of practically and laboratory works. Execution of independent works.	5
Theme 2. The More's integral.	2/2/2			5
Theme 3. The construction method of the diagram of shear-force and bending-moment for the cantilever frame	2/4/2			5
Theme 4. The construction method of the diagram of shear-force and bending-moment for the simple frame.	2/2/2			5
Theme 5. The definitions of the statically indeterminate constructions.	2/4/2			5
Theme 6. The application of the Castigliano's theorem to the statically indeterminate constructions.	2/2/2			5
Theme 7. The three moment's theorem.	2/4/2			5
Theme 8. The application of the Verescagin's rule to the statically indeterminate constructions.	2/2/2			5
The thematic module 5. THE COMPLEX DEFORMATIONS				30
Theme 1. Analysis of Stress and Strain in the case of combined bending and tension or compression	2/4/2	<p style="text-align: center;">Student should be know: Stress and Strain in the case of the action of complex deformations of construction.</p> <p style="text-align: center;">Student should be able to: calculate beam and frame by acting of complex Stress and</p>	Delivery of practically and laboratory works. Execution of independent works.	4
Theme 2. Analysis of Stress and Strain in the case of a complex bending	2/2/2			4
Theme 3. Analysis of Stress and Strain in	2/4/2			4

the case of the off-centre acting of force of tension or compression		Strain.		
Theme 4. Analysis of Stress and Strain in the case of combined bending and torsion at once	2/2/2			10
Theme 5. The calculation method of column.	2/4/2			4
Theme 6. Analysis of Stress and Strain in the cases of acting difference types of dynamic loads	4/5/4			4
Total for 4 semester	30/45/30	-	-	70
Exam				30
Total for course				100

EVALUATION POLICY

<i>Deadline and retake policy:</i>	The student must submit the work within the time specified by the teacher. Works that are submitted in violation of deadlines without good reason are evaluated at a lower grade. Rearrangement of modules takes place with the permission of the lecturer if there are good reasons (for example, hospital).
<i>Academic Integrity Policy:</i>	Write-offs during tests and exams are prohibited (including the use of mobile devices). Course papers, abstracts must have correct text references to the literature used
<i>Visiting policy:</i>	The student is obliged to attend classes of all kinds every day in accordance with the established schedule, not to be late, to have the appropriate appearance. For objective reasons (for example, illness, international internship) training can take place individually (in online form in consultation with the dean of the faculty)

STUDENT EVALUATION SCALE

Student rating, points	Evaluation results on national exam tests	
	Exams	Tests
90-100	Excellent	Accepted
74-89	Great	
60-73	Satisfactory	
0-59	Unsatisfactorily	Not accepted