SYLLABUS

1. Program Data

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**ENERGY ENGINEERING AND INDUSTRIAL MANAGEMENT**
1.3 Department	**TEXTILES, LEATHER AND INDUSTRIAL MANAGEMENT**
1.4 Field of study	**ENGINEERING AND MANAGEMENT**
1.5 Cycle of studies	**LICENSE**
1.6 Study Programme/Qualification	**INDUSTRIAL ECONOMIC ENGINEERING/ENGINEER**

2. Data about the discipline

2.1 Name of the discipline	**MECHANICS, STRENGTH OF MATERIALS**						
2.2 Course Activity Holder	Assoc. Prof. Rațiu Mariana, Ph.D.						
2.3 Seminar Activity Holder	Assoc. Prof. Rațiu Mariana, Ph.D.						
2.4 Year of study	**I**	2.5 Semester	**I**	2.6 Type of assessment	**Vp**	2.7 Discipline regime	**I**

(I) Imposed; (o) optional; (F) Optional

3. Total estimated time (hours per semester of teaching activities)

3.1 Number of hours per week	2	of which: 3.2 course	1	3.3 Seminar	1
3.4 Total hours in the curriculum	28	of which: 3.5 course	14	3.6 Seminar	14

Distribution of the time fund	Hours
Study by textbook, course material, bibliography and notes	27
Additional documentation in the library, on specialized electronic platforms and in the field	6
Preparation of seminars/laboratories, assignments, papers, portfolios and essays	6
Tutorials	2
Examination	6
Other activities.....	-

3.7 Total hours of individual study	**47**
3.9 Total hours per semester	**75**
3.10 Number of credits	**3**

4. Preconditions (where applicable)

4.1 Curriculum	(Conditional)
4.2 Competences	

5. Conditions (where applicable)

5.1. Course	**Conditions provided by the education provider:** • Classroom with adequate infrastructure, equipped with sheet metal. • Student access to online learning platforms. **Conditions imposed on participants in the educational process (students):** • Participation in teaching activities, online or onsite.
5.2. Seminar	**Conditions provided by the education provider:** • Seminar room with adequate infrastructure, equipped with sheet metal. • Student access to online learning platforms. **Conditions imposed on participants in the educational process (students):** • Participation in teaching activities, online or onsite.

6.1. Specific competences acquired

Professional skills	The discipline mainly contributes to the consolidation of the C1 and C2 professional competences of the study program, by providing the following specific competences: - the ability to know, understand, define and apply the basic principles, concepts, theories and methods in mechanics and the strength of materials - the ability to perform calculations, demonstrations and specific applications, based on basic theoretical knowledge in mechanics and material strength, such as calculations for designing, sizing or checking machine parts more often found in the composition of machines and equipment in the textile-leather field
Transversal competences	- the ability to make interdisciplinary connections, as well as the transfer of knowledge specific to the mechanics and strength of materials within future specialized technical disciplines

6.2. Expected learning outcomes

Knowledge	The student identifies and describes principles of economic and managerial engineering, characteristics of software packages to assist activities in the field. The student explains and interprets the technical, economic and managerial documentation for the development of projects and processes specific to the field.
Skills	The student appreciates quality and identifies the limits of concepts, symbolizations and representations specific to the field. The student selects and applies concepts, principles and methods for solving particular problems in the elaboration of technical, economic and managerial documentation. The student applies health and safety standards in solving tasks specific to engineering and management. The student evaluates the advantages and limitations of software applications for solving tasks specific to engineering and management. The student develops the technical, economic and managerial documentation associated with specific engineering and management projects. The student applies techniques and methods of programming software applications, creates and operates with databases. The student models and simulates concepts and processes in solving specific tasks, in a computer-assisted regime. The student develops technical-economic and/or managerial projects with computer assistance through the use of software applications specific to engineering and management.
Responsibility and autonomy	The student documents, describes and manages processes specific to the management of engineering projects with taking on different roles in the team and presenting the results. The student develops work and communication skills for effective collaboration in performing tasks specific to engineering and management. The student initiates and manages actions to update the professional knowledge specific to the field. The student evaluates and capitalizes on business and entrepreneurial development opportunities. The student becomes aware of the aspects of social responsibility and professional ethics

7. Objectives of the discipline (resulting from the grid of specific competences acquired)

7.1 General objective of the discipline	The discipline is part of the disciplines of general technical culture, which are defining for the training of the engineer and aims to provide students with the basic notions of theoretical mechanics and calculation of design, dimensioning or verification of machine parts found more often in the composition of machines and equipment in the textile-leather field. Within the discipline, knowledge acquired in the disciplines of mathematics, physics, technical drawing is used, preparing the theoretical basis for approaching specialized disciplines.
7.2 Specific objectives	The course of the discipline "Mechanics and strength of materials" aims to bring more theoretical knowledge specific to the students, to develop a series of aptitude skills, abilities and competences: - *theoretical knowledge*: knowledge, understanding and definition of basic principles, concepts, theories and methods in mechanics and the strength of materials - *Acquired skills*: use of basic theoretical knowledge to explain and interpret

	theoretical results, theorems, phenomena or processes specific to the mechanics and strength of materials - *Acquired skills*: applying basic principles, concepts, theories and methods in mechanics and the strength of materials, to solve specific problems of mechanics and the strength of materials, such as the calculation of design, sizing or verification of machine parts more often encountered in the composition of machines and equipment in the textile-leather field; making interdisciplinary connections, as well as transferring knowledge specific to mechanics and strength of materials in future technical disciplines, as well as in subsequent professional activity - *attitudinal skills*: awareness of the need to acquire basic knowledge in mechanics and the strength of materials, of the need for continuous professional training, in order to develop personally and professionally.

8. Contents

8.1 Course	Teaching methods	No. of hours
Mechanics - general problems Definitions; reference systems; fundamental principles of mechanics; mechanics divisions; general notions and concepts of mechanics	The students will be presented with the basic theoretical notions of mechanics and the strength of materials, using the method of oral exposition or with the help of the video projector, respectively of the computer, the method of conversation; cooperative learning; Modelling. Also, it will be insisted on the awareness of the need to acquire this knowledge, necessary for approaching future specialized disciplines, as well as the need for continuous professional training, in order to develop personally and professionally.	1
Static Statics of the material point; statics of the rigid solid.		3
Kinematics Kinematics of the material point; trajectory, speed, acceleration; kinematics of the rigid solid; particular motions.		2
Dynamics Dynamics of the material point; moments of inertia; dynamics of the rigid solid; dynamics of the rigid with fixed axis.		1
Strength of materials - getting started Definitions, notions and general concepts, hypotheses regarding the properties of materials; unitary efforts; relations between unitary efforts and deformations.		1
Stretch Stress – Compression Definitions; determination of the stresses in the cross-sections of straight bars subjected to tension or compression; determination of deformations in the cross-sections of straight bars subjected to stress or compression; tensile or compressive strength calculations; Stress charts in straight bars.		2
Shear Stress General definitions and concepts; Hooke's law for shear; shear strength calculations.		1
Bending Stress General definitions and concepts; bending strength calculations; Stress diagrams in straight bars required when bending.		1
Twist Stress General definitions and concepts; calculations of twist strength.		1
Buckling General definitions and concepts; bucklingstrength calculations.		1

Bibliography

1. Mareș M. – Strength of Materials, part I – course for students from CMMI – Faculty of Mechanics, https://mec.tuiasi.ro/rm/index.html
2. Prichici M. – Mechanics : Vol. 1 : Statics, University of Oradea Publishing House, 2017
3. Prichici M. – Mechanics : Vol. 2 : Kinematics and Dynamics, University of Oradea Publishing House, 2018
4. Prichici M. – The Strength of Materials, University of Oradea Publishing House, 2013
5. Rațiu M. – Mechanics, strength of materials – course notes, 2023, https://e.uoradea.ro/course/view.php?id=66208
6. Rațiu M. – Support for the study of remedial activity Mechanics, strength of materials. ROSE Project, IEMI Faculty, 2019
7. Tătaru M., Fazecaș M.B. – Strength of Materials, University of Oradea Publishing House, 2006

8.2 Seminar	Teaching methods	No. of hours
Graphical and analytical reduction of force systems.	The principles, concepts, theories and basic methods of mechanics and material strength, presented in the course, will be applied to solve specific problems of mechanics and material strength. The teaching methods used will be: the method of learning through discovery; analysis and problem solving; the method of learning in small groups; the method of working with the textbook and the STAS; computer-aided training.	2
The equilibrium of the material point.		2
The equilibrium of the rigid solid.		2
Calculation of reactions from links.		2
Stretch – compression stress. Shear stress.		2
Straight bar stress diagrams required when bending.		2
Twist stress. Stress to bucking.		2

Bibliography

1. Mureșan N., Fazecaș M.B. – Statics. Cinematics. Dynamics: collection of problems, University of Oradea Publishing House, 2014
2. Prichici M. – Mechanics - Laboratory work and homework tutor, University of Oradea Publishing House, 2014
3. Prichici M. – Support for individual study in the discipline: Strength of materials I, Univ. Oradea, 2011
4. Rațiu M. – Mechanics, Strength of Materials – Seminar Applications, 2023, https://e.uoradea.ro/course/view.php?id=66208
5. Rațiu M. – Support for the study of remedial activity Mechanics, strength of materials. ROSE Project, IEMI Faculty, 2019

9. Corroboration of the contents of the discipline with the expectations of the representatives of the epistemic community, professional associations and employers representative in the field related to the program

The content of the subject is in accordance with that of similar subjects taught at other universities in the country and abroad.

10. Assessment

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Weight in the final grade
10.4 Course	- For grade 5, the student must obtain at least grade 6 in each of the two checks along the way. - For a grade of 10, the student must obtain a grade of 10 in each of the two checks along	Two checks along the way, in the form of grid tests.	40 %+40 % - the marks obtained in the two checks along the way 20% - grades obtained as a result of attendance and active
10.5 Seminar			

	the way and have 100% attendance at the teaching activities.		participation in classes
10.6 Minimum Performance Standard			
After passing the discipline, the student must have the ability to: - recognises the terms and concepts specific to the discipline - reproduces the main concepts studied, as well as the related graphic representations - solve specific theoretical and applied problems - To achieve interdisciplinary connections, as well as the transfer of knowledge specific to mechanics and the strength of materials within future specialized technical disciplines, as well as in the subsequent professional activity.			

Completion date:	**Course holder:**	**Seminar holder:**
23.09.2025	Assoc. Prof. Rațiu Mariana, Ph.D. Email: mratiu@uoradea.ro Signature:.....	Assoc. Prof. Rațiu Mariana, Ph.D. Email: mratiu@uoradea.ro Signature:.....

The department that provides the hours:	
Date of approval in the department: 22.09.2025	Director Department of Mechanical Engineering and Vehicles Assoc. Prof. Mitran Tudor-Adrian, Ph.D. E-mail: tudor_mitran@uoradea.ro Signature:.....
The department benefiting from the Syllabus:	
Date of approval in the department: 24.09.2025	Director Department of Textiles, Leather and Industrial Management Assoc. Prof. Gherghel Sabina, Ph.D. Email: sgherghel@uoradea.ro Signature:.....
Date of approval in IMT Faculty Council: 23.09.2025	Dean Faculty of Managerial and Technological Engineering Assoc. Prof. HuleVoichița-Ionela, Ph.D. Email: vhule@uoradea.ro Signature:.....
Date of approval in IEMI Faculty Council: 29.09.2025	Dean Faculty of Energy Engineering and Industrial Management Assoc. Prof. Hora Cristina, Ph.D. E-mail: chora@uoradea.ro

	Signature:.....