

## SYLLABUS

### 1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Civil Engineering
1.3	Department	Mecanica constructiilor
1.4	Field of study	Civil Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Civil, Industrial and Agricultural Buildings /Engineer (English language)
1.7	Form of education	Full time
1.8	Subject code	20.0

### 2. Data about the subject

2.1	Subject name				Mecanica II						
2.2	Course responsible/lecturer				Prof.Dr.Ing. Alexa Pavel-Pavel.Alexa@mecon.utcluj.ro						
2.3	Teachers in charge of seminars				Sl.Dr.Ing. Prodan Ovidiu-Ovidiu.Prodan@mecon.utcluj.ro						
2.4	Year of study	2	2.5	Semester	1	2.6	Assessment	E	2.7	Subject category	DID/DI

### 3. Estimated total time

3.1	Number of hours per week	4	3.2	of which, course:	2	3.3	applications:	
3.4	Total hours in the curriculum	56	3.5	of which, course:	28	3.6	applications:	
Individual study								hours
Manual, lecture material and notes, bibliography								30
Supplementary study in the library, online and in the field								8
Preparation for seminars/laboratory works, homework, reports, portfolios, essays								28
Tutoring								3
Exams and tests								6
Other activities								0
3.7	Total hours of individual study	69						
3.8	Total hours per semester	125						
3.9	Number of credit points	5						

### 4. Pre-requisites (where appropriate)

4.1	Curriculum	Mechanics 1
4.2	Competence	-

### 5. Requirements (where appropriate)

5.1	For the course	-
5.2	For the applications	-

## 6. Specific competences

Professional competences	General preparation for engineering thinking Engineering concepts of motion, of inertia Mathematical models of motion of mechanical systems Principles of Mechanics applied in Structural analysis
Cross competences	Engineering rigorousness in computation Use of appropriate units in International System of Units A general view of rest state as a particular state of motion

## 7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Mechanics II is the basis of Structural analysis in Civ. Eng.
7.2	Specific objectives	Motion of particle Motions of rigid bodies Plane motion

## 8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
1. Motion of particle: space, velocity, acceleration in several systems of reference	-	-
2. Circular motion of particle.		
3. Vectorial character of velocity and acceleration and their scalar components in several systems of reference		
4. Translation motion of rigid body		
5. Rotation about fixed axis of rigid body		
6. Plane motion of rigid body		
7. Introduction in Dynamics. Principles of Mechanics		
8. Dynamics of particle		
9. Moments of inertia		
10. Theorems of impulse		
11. Theorems of energy		
12. Principle of D'Alembert		
13. Kinetic - static method		
14. Principle of virtual work		
Bibliography Bibliography Introduction to Classical Mechanics: with problems and solutions (Cambridge University Press - 2008) by David Morin		
8.2. Applications/Seminars	Teaching methods	Notes
1. Short review of systems of reference and associated coordinates	-	-
2. Circular motion of particle		
3. Circular motion of a system of particles		
4. Translation motion of rigid body		
5. Rotation motion of rigid body around a fixed axis		
6. Instantaneous centres of rotation in plane motion		

7. Plane motion of a system of plates		
8. Dynamics of particle		
9. Moments of inertia		
10. Theorems of impulse		
11. Theorems of energy		
12. Kinetic - static method		
13. Kinetic static method		
14. Principle of virtual work		
Bibliography		
Bibliography		
Introduction to Classical Mechanics: with problems and solutions (Cambridge University Press - 2008) by David Morin		

**9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field**

Mechanics II generates a solid scientifically engineering thinking. The contents relates the natural and engineering phenomena to their mechanical and mathematical modelling.  
The Principles of Analytical Mechanics (of D'Alembert and of Virtual Work) are directly related to Structural Analysis of Civ. Eng. structures.

**10. Evaluation**

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Ability to approach and model mechanical state of engineering systems	Exam - written papers (T)	T=30%; Q=10% T = Theory Exam; Q = Weekly quiz after each lecture
10.5 Applications	Ability to generate and apply mechanical and mathematical models of mechanical systems	Exam - written papers and oral examination Partial Exam in the middle of the semester	A=30%; H=30% A = Applications during Exam; Q = Weekly homework after each tutorial
10.6 Minimum standard of performance			
Each subject and application has to be greater than 5 out of 10.			

Date of filling in:		Title Surname Name	Signature
	Lecturer	Prof.Dr.Ing. Alexa Pavel	
	Teachers in charge of application	Sl.Dr.Ing. Prodan Ovidiu	

Date of approval in the department .....

19/06/2025

Head of department  
conf.dr.ing. Anca-Gabriela POPA

Date of approval in the faculty .....

25/06/2025

Dean  
prof.dr.ing Daniela Manea