SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Electrical Engineering
1.3	Department	Electrotechnics and Measurements
1.4	Field of study	Electrical Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/ Qualification	Electrical System Cluj-Napoca in English language
1.7	Form of education	Full time
1.8	Subject code	6.00

2. Data about the subject

2.1	Subject name			Mechanics		
2.2	Course responsible/ lecturer			Prof. Eng. Diana Ioana Popescu, PhD. Diana.Popescu@mep.utcluj.ro		
2.3	Teachers in charge of Seminars/ Laboratory/ Project			Prof. Eng. Diana Ioana Popescu, PhD. Diana.Popescu@mep.utcluj.ro		
2.4 Year of study	I	2.5 Semester	1	2.6 Type of assessment *(E – exam, C – colloquium, V – verification)*	E	
2.7 Subject category	*DF – fundamental, DD – in the field, DS – specialty, DC – complementary*				DF	
	DI – compulsory, DO – elective, Dfac – optional				DI	

3. Estimated total time

3.1 Number of hours per week:	3	of which	3.2 Course	2	3.3 Seminar		3.3 Laboratory	1	3.3 Project	
3.2 Total hours per semester	42	of which	3.5 Course	28	3.6 Seminar		3.6 Laboratory	14	3.6 Project	

3.7 Individual study:	
(a) Manual, lecture material and notes, bibliography	20
(b) Supplementary study in the library, online and in the field	6
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays	4
(d) Tutoring	
(e) Exams and tests	3
(f) Other activities	

3.8 Total hours of individual study *[sum (3.7(a) to 3.7(f))]*	33
3.9 Total hours per semester *[sum of 3.4 and 3.8]*	75
3.10 Number of credit points	3

4. Prerequisites (where applicable)

4.1	Curriculum	
4.2	Competences	

5. Requirements (where appropriate)

5.1	For the course	
5.2	For the applications	Attendance at laboratory sessions is mandatory

6. Specific competences

Professional competences	Upon completion of the course, students will be able to: • Understand the phenomena, principles, and theorems specific to statics, kinematics, and dynamics of mechanical systems • Establish the equations of motion corresponding to material systems • Evaluate the parameters that characterize the motion of a mechanical system and the performance indicators that define its dynamic behavior
Cross competences	Efficient use of information sources and communication and professional training resources (Internet portals, specialized software applications, databases, online courses, etc.), both in Romanian and in an international language

7. Expected learning outcomes

Knowledge	The student/graduate identifies and describes basic concepts, principles, and methods in mathematics, physics, chemistry, technical drawing, economics, and computer science.
Abilities	The student/graduate operates with basic concepts, principles, and methods from fundamental disciplines. The student/graduate solves problems of mathematics, physics and chemistry with applicability in engineering and validates the solution obtained. The student/graduate performs engineering and economic calculations of medium complexity and associates them with graphic representations of letters or specific to computer-aided design. The student/graduate describes physico-chemical and economic phenomena and processes.
Responsibility and autonomy	The student/graduate applies the values of ethics and deontology of the engineering profession. The student/graduate practices logical reasoning, evaluation and self-evaluation in decision-making.

8. Discipline objectives (based on specific competencies acquired)

8.1	General objective	Acquisition of the general principles and theorems governing the motion of mechanical systems.
8.2	Specific objectives	• To acquire knowledge of concepts such as: reduction of forces, mass geometry, equilibrium of mechanical systems, kinematics of a point and of a rigid body, and the general theorems of dynamics • To understand the phenomena, principles, and theorems specific to statics, kinematics, and dynamics of mechanical systems • To evaluate the parameters that characterize the motion of a mechanical system • To establish parametric equations of motion, as well as velocity and acceleration distributions in the case of rigid body motion

		• To assess the performance indicators that define the dynamic behavior of mechanical systems • To analyze and interpret the data obtained in the study of system mechanics

9. Contents

9.1. Course (Lectures)		Number of hours	Teaching methods	Additional remarks
1	General concepts	2	In the teaching process, a graphic tablet and multimedia devices are used.	Lectures are conducted for 2 hours per week.
2	Reduction of force systems	2		
3	Mass geometry	2		
4	Equilibrium of a material point and a rigid body	2		
5	Equilibrium of systems of particles and rigid bodies	2		
6	Statics of cables	2		
7	Kinematics of a material point	2		
8	Kinematics of a rigid body	2		
9	Relative motion of a material point	2		
10	Fundamental elements of dynamics	2		
11	General theorems of dynamics	2		
12	Elements of analytical mechanics	2		
13	General concepts	2		
14	Reduction of force systems	2		

Bibliography

1. Ripianu A., Popescu P., Bălan B.I., Mecanică tehnică pentru subingineri, EDP, Bucureşti, 1982.
2. Voinea R., Voiculescu D., Simion F.-P., Introducere în mecanica solidului cu aplicaţii în inginerie, E. A., Bucureşti, 1989.
3. Ispas V.,..., Fodor G., Mecanica, Ed. Dacia, Cluj-Napoca, 1997, ISBN 973-35-0697-4.
4. Itul T.P., Fodor G., Mecanică. Statică. Cinematică. Dinamică, Ed. U.T.PRESS, Cluj-Napoca, 2014, ISBN 978-973-662-965-5.
5. Bratu P., Mecanica teoretică, Ed. Impuls, Bucureşti, 2006, ISBN 973-8132-57-6.
6. Itul T.P., Haiduc, N., Mecanica, Ed. U.T.PRESS, Cluj-Napoca., 2012, ISBN 978-973-662-704-0.
7. Negrean I., Mecanică – Teorie şi aplicaţii, U.T.PRESS, Cluj-Napoca, 2012, ISBN 978-973-662-523-7.
8. Şarian M., ş.a., Probleme de mecanică, EDP, Bucureşti, 1983.
9. Ripianu A., ş.a., Mecanica. Îndrumător de lucrări, Lito IPCN, 1984.
10. Ispas V., Deteşan O.-A., Probleme de mecanică. Statica, EDP, Bucureşti, 2006, ISBN 973-30-1645-4.
11. Ispas V., Aurora-Felicia Pop, Probleme de mecanică. Cinematică, EDP, Bucureşti, 2009, ISBN 978-973-30-1645.
12. Fodor G., Mecanica. Aplicații – Probleme și lucrări de laborator, http://www.east.utcluj.ro/mb/mep/files/gfodor/curselectro.pdf
13. Fodor G., Aurora Felicia Cristea, Mecanică aplicată. Lucrări de laborator, U.T.PRESS, Cluj-Napoca, 2019, ISBN 978-606-737-363-9.

9.2. Applications - Seminar /Laboratory/Project		Number of hours	Teaching methods	Additional remarks
1	L1 – Reduction of a coplanar system of forces using analytical and graphical methods	2	During laboratory sessions, the topic is introduced and the experiment is presented, after which students solve the assigned tasks individually.	Laboratory activities are conducted in subgroups, with meetings taking place once every four weeks for 4 hours. Additional problems are also solved.
2	L2 – Analytical and graphical determination of the center of gravity of a homogeneous plane plate	2		
3	L3 – Determination of axial moments of inertia using the physical pendulum method	2		
	L4 – Determination of axial moments of inertia in bodies undergoing rotational motion	2		
	L5 – Demonstration of the Coriolis inertial force	2		
	L6 – Electrical modeling of a single-degree-of-freedom mechanical system	2		
	L7 – Problem Solving Exercises	2		

Bibliography

1. Fodor G., Mecanica. Aplicații – Probleme și lucrări de laborator, http://www.east.utcluj.ro/mb/mep/files/gfodor/curselectro.pdf 13. Fodor G., Aurora

2. Felicia Cristea, Mecanică aplicată. Lucrări de laborator, U.T.PRESS, Cluj-Napoca, 2019, ISBN 978-606-737-363-9.

3. Ripianu, A., Popescu, P., Plitea, N., Ursu, N., Balan B, Marcu , V., Ispas, V., Popa, L., Arghir, M., Sagyebo, L., Mugur, G., Mecanica. Lucrari de laborator. Indrumător, Cluj-Napoca, Atel. de multiplicare al Instit. Politehnic, Cluj-Napoca, 1984, 174 pg.

10. Alignment of course content with expectations of the epistemic community, professional associations, and representative employers in the field

The alignment of the course content with the expectations of the epistemic community, professional associations, and employers is ensured through periodic discussions organized by the faculty with representatives of employers.

11. Assessment

Activity type	11.1 Assessment criteria	11.2 Assessment methods	11.3 Weight in the final grade (%)
11.4 Course	Exam consisting of five applications (multiple-choice test)	Written exam, lasting three hours. Question session for the assessment of theoretical knowledge.	80%
11.5 Applications	The portfolio of laboratory work and seminar assignments is graded if submitted within the established deadlines	Graded on a scale from 2 to 10	20%
11.6 Minimum standard of performance: Understanding of basic concepts and terminology; problem-solving abilities			

Date of completion	Lecturers	Title/ Surname/ Name:	Signature
September 2025	Course	Prof. Eng. Diana Ioana Popescu, PhD. Diana.Popescu@mep.utcluj.ro	
	Applications Seminar/ Laboratory/ Project	Prof. Eng. Diana Ioana Popescu, PhD. Diana.Popescu@mep.utcluj.ro	

Date of approval in the ETHM Department Council September 2025	**Head of Department:** Prof. Eng. MICU Dan Doru, PhD
Date of approval in the Faculty of Electrical Engineering Council September 2025	**Dean:** Assoc. Prof. Eng. CZIKER Andrei, PhD