SYLLABUS

1. Course title:

DYNAMICS AND OSCILLATIONS

2. Code:

3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course:

Mandatory

6. Prerequisites:

Listen to lectures on Dynamics and Oscillations, attend exercises

7. Class restrictions:

8. Duration / semester(s):

| 1 | 3 |

9. Weekly contact hours and student workload:

	Semester (1)	III	Semester (2)		(for two-semester courses)	Workload: (hours)	
9.1. Lectures		4			Classes:	56,25	
9.2. Seminars		1			Individual work:	110,0	
9.3. Laboratory / Practice classes		0			In total:	167,25	

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

Energy and Thermo-Fluid Engineering, Production Engineering, Mechatronics

12. Lecturer:

dr.sc. Seniha Karić, docent

13. Course aims:

The aim of the course is to transfer knowledge and skills in the field of dynamics and oscillations to students. Training them to independently solve problems in the field of dynamics and oscillations.

14. Learning outcomes:

Based on the knowledge acquired during the course, students will be able to solve problems in dynamics and oscillations. Also, assess what type of movement is involved and which dynamic laws to apply and solve as such. The acquired knowledge is necessary for independently solving problems in dynamics and oscillations, and as basic prerequisites for studying other subjects in the field of dynamics: Mechanisms and dynamics of machines, etc.

15. Course content:

1. Dynamics of a material point, Differential equations of motion of a material point
2. General laws of motion of a material point,
3. Motion of a point under the action of a central force, D'Alembert's principle for a material point
4 Dynamics of a system of material points and a rigid body, General laws of motion of a material system,
5. Motion of a body of variable mass
6. Principal moment of momentum of a material system, Kinetic energy of a material system, D'Alembert's principle for a system
7. Dynamics of a rigid body rotating around a fixed point, Approximate theory of gyroscopic phenomena
8. Shock theory, Elements of analytical mechanics
9. Test 1
10. Rectilinear small oscillations of a material point (free)
11. Rectilinear small oscillations of a material point (damped)
12. Rectilinear small oscillations of a material point (forced)
13. Small oscillations of a system with one and two degrees of freedom
14. Small oscillations of a material system a , Speeds of high-speed shafts
15. Test 2

16. Learning methods:

-Lectures using multimedia tools, active learning techniques and with active student participation;
- Auditory exercises;
- Assignments.

17. Assessment methods:

After half of the semester, students take a written test (the first partial exam, which is taken during the lecture period) that includes tasks from the topics covered so far. The test consists of multiple-choice tasks. A student can earn a maximum of 30 points on the first partial exam (50% of the work done is a pass). After the end of the semester, students take a written test (the second partial exam, which is taken during the lecture period) that includes tasks from the topics covered from the second part of the semester. The test consists of multiple-choice tasks. A student can earn a maximum of 30 points on the second partial exam (50% of the work done is a pass). Both tests are taken by all students in the subject at the same time, which ensures uniformity in the level of knowledge being tested, as well as the conditions under which the student takes the exam. For attending classes (lectures and exercises) throughout the semester, a student can earn up to 5 points. For completed assignments from lectures and exercises, a student can earn 5 points. For pre-exam obligations, a student can earn a maximum of 0 points. The final exam consists of theory and is taken in writing and orally (in cases where approximately 50% of the questions on the written exam are answered correctly or the student takes an additional exam for a higher grade). The right to take the final exam is reserved for students who have completed the course and fulfilled the pre-exam requirements. In the final exam, the student answers questions from the course syllabus covered in lectures. The final exam is taken separately on dynamics and oscillations. The final exam can be passed if the student answers most of the questions on dynamics and most of the questions on oscillations correctly. A student can pass one part of the final exam (dynamics or oscillations) in one exam period and the other remaining part of the exam in the next. The maximum number of points a student can achieve on the final exam is 30 points (15 dynamics and 15 oscillations). The make-up exam is taken in the same way as the final exam. In order to pass the exam, the student must achieve a minimum of 54 points.

18. Assessment components:

The exam grade is based on the total number of points that the student has earned by fulfilling the pre-exam requirements and taking the exam, and according to the quality of the acquired knowledge and skills, and contains a maximum of 100 points, and is determined according to the following scale:

Grading scale is as follows:

Student obligation points	Grade	Description	Letter/Points
Attendance at lectures and exercises 5	5 (five)	Does not meet minimum criteria	F <54
Assignments 5	6 (six)	Meets minimum criteria	E 54-64
Test 1 assignments 30	7 (seven)	Generally good, but with significant shortcomings	D 65-74
Test 2 assignments 30	8 (eight)	Average, with noticeable errors	C 75-84
Total pre-exam requirements 70	9 (nine)	Above average, with some errors	B 85-94
Final exam written and oral theory 15+15=30	10 (ten)	Exceptional with no or minor errors	A 95-100

19. Mandatory reading list:

Vukojević D., Ekinović E., (2008) Dinamika, Zenica
Vukojević D. (2004) Teorija oscilacija, Zenica
Baričak V. , (2007) Zbirka zadataka iz dinamike, Tuzla

20. Additional reading list:

Doleček V. and others., (1985) Zbirka zadataka iz dinamike i oscilacija, Sarajevo

21. Web sources:

22. Applicable from the academic year:

2025/2026

23. Adopted in the Faculty/Academy session: