SYLLABUS

1. Course title:

Mechanisms in mechatronics

2. Code:

3. Cycle of study:

1

4. ECTS credits:

4

5. Type of course:

Mandatory

6. Prerequisites:

No

7. Class restrictions:

Students of the 3rd year of study at the Faculty of Mechanical Engineering (Ist cycle of studies)

8. Duration / semester(s):

1 2

9. Weekly contact hours and student workload:

	Semester (1)	Semester (2)	(for two-semester courses)	Workload: (hours)	
9.1. Lectures	3		Classes:	33,75	
9.2. Seminars	0		Individual work:	76,58	
9.3. Laboratory / Practice classes	0		In total:	110,3	

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

Mechatronics

12. Lecturer:

Dr.sc. Denijal Sprečić, Full Professor

13. Course aims:

The basic goal of teaching in the subject "Mechanics in mechatronics" is to train students to solve engineering problems related to the application of mechanisms in the mechatronics, and to master the necessary skills and methods for solving problems in the given field.

14. Learning outcomes:

At the end of the semester, successful students, who have continually performed their duties throughout the teaching process, will be able to solve tasks related to design (analysis and synthesis) of mechanisms.

15. Course content:

1. Introduction, goal and task of the theory of mechanisms, basic concepts and definitions
2. Structural analysis of mechanisms, kinematic pairs, mobility of mechanisms, kinematic chains, mechanism design
3. Kinematic analysis of mechanisms, analytical and graphical determination of speed and acceleration of points of mechanisms, instantaneous speed poles
4. Method of w-cofunction, determination of mechanism speed based on reduced mechanism of the first degree
5. Determination of mechanism acceleration based on reduced mechanism of the second degree
6. Dynamic analysis of mechanisms, determination of inertial forces, kinetostatic analysis of mechanisms
7. Determination of reaction in kinematic pairs, dynamics of the driving member, influence of friction on the movement of mechanisms
8. Reduction of forces and moments of mechanism, reduction of masses and moments of inertia of mechanisms
9. Colloquium - assignments
10. Equivalent masses, determination of flywheel moment of inertia
11. Achieving a given degree of unevenness of movement of a mechanism
12. Balancing mechanisms
13. Synthesis mechanisms
14. Gears, cam mechanisms
15. Colloquium - theory

16. Learning methods:

• Lectures cover teaching units defined by the course content.
• Consultations that can be organized as office consultations lasting a minimum of 5 hours per week, during which students are given the opportunity to obtain additional clarifications on the material covered in the teaching units or as consultations via e-mail.
• Program assignments that students solve during the semester, independently and, if necessary, in consultation with the teaching staff.

17. Assessment methods:

The methods of knowledge checking are: graphic assignments, colloquiums, final exam (written).

• Regular attendance and teaching activities (lectures and exercises) carry a maximum of 5 points,

• Program assignments contain tasks that the student needs to solve and submit before the final exam. The total number of points a student can obtain for graphic assignments is a maximum of 10 points.

• Colloquiums represent the form of continuous checks that are defined during the semester and within which students are solving tasks from certain areas. The sum of the points from each colloquium that a student can obtain is a maximum of 40 points.

• Final exams are submitted in writing, and student can obtain a maximum of 45 points.

Rating system: (5) + (10) + (15) + (25) + (45) = (100) points

Grading scale is as follows:

Grade	Description	Letter/Points
5 (five)	Does not meet minimum criteria	F <54
6 (six)	Meets minimum criteria	E 54-64
7 (seven)	Generally good, but with significant shortcomings	D 65-74
8 (eight)	Average, with noticeable errors	C 75-84
9 (nine)	Above average, with some errors	B 85-94
10 (ten)	Exceptional with no or minor errors	A 95-100

In order for a student to obtain professor's signature and to take the final exam, it is necessary to fulfill the following conditions:
- regularly attend to lectures and exercises,
- to fulfill all the other conditions that the subject teacher places during the semester.

Summarized points are collected from all student activities during the semester to the final exam. If the student has obtained the required score for the pass grade, the grade can be entered in the index. If the student has not achieved the required number of points, additional points can be obtained on the final written exam.

18. Assessment components:

The assessment of the exam is based on the total number of points the student has obtained by fulfilling the pre-requisites and passing the exam according to the quality of the acquired knowledge and skills, and it contains a maximum of 100 points and is determined according to the following scale:

Before the final exam: 55 points
Final exam: 45 points

Before the final exam:
• attendance and activity on lectures (lectures and exercises) - maximum 5 points,
• graphic assignments - maximum 10 points,
• colloquiums - maximum 40 points (25 points for theory colloquium and 15 points for assignments colloquium)

19. Mandatory reading list:

1. Badžak I., Dedić R.: Mehanizmi, Mostar, 2013. .

20. Additional reading list:

1. D. Sprečić.: Mehanizmi i dinamika mašina: zbirka zadataka; Tuzla 2004.
2. Rider M.: Design and Analysis of Mechanisms: A Planar Approach, John Wiley & Sons 2015.
3. Sekulić A.: Projektovanje mehanizama, Beograd, 1998.

21. Web sources:

22. Applicable from the academic year:

2025/2026.

23. Adopted in the Faculty/Academy session: