SYLLABUS

1. Course title:

Fundamentals of Mechanical Operations

2. Code:

3. Cycle of study:

1

4. ECTS credits:

3

5. Type of course:

Elective

6. Prerequisites:

7. Class restrictions:

8. Duration / semester(s):

I VI

9. Weekly contact hours and student workload:

	Semester (1)	Semester (2)	(for two-semester courses)	Workload: (hours)
9.1. Lectures	2		Classes:	33,75
9.2. Seminars	0		Individual work:	55,83
9.3. Laboratory / Practice classes	1		In total:	89,58

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

Mehatronics

12. Lecturer:

dr.sci. Izet Alić, professor

13. Course aims:

Acquiring basic knowledge of mechanical operations and processes aimed at their application. Develop aptitudes for assessment, the basics of budgeting (dimensioning), and the selection of individual elements and devices applicable in the professional field of activity.

14. Learning outcomes:

- recognize and name the key devices, assemblies and machines in the process of mechanical operations and transportation of crushed solid materials;
- apply your knowledge in solving practical tasks on examples of individual devices and installation assemblies;
- distinguish types and methods of mechanical operations and propose more effective procedures in certain cases of practice;
- operate devices during the transport of crushed particles using gaseous and liquid media

15. Course content:

1. Basic terms. Purpose and application. Dispersed systems.
2. Basic terms and definitions. Mixing of participants, porosity, hygroscopicity. Shredding of solid materials. Defining the purpose of shredding methods and procedures. Crushing and grinding. Machines and devices for shredding solid materials.
3. Deposition of particles. Free deposition, resistance forces (spherical and non-spherical particles). Particle settling velocity.
4. Coagulation. Flocculation. Precipitators.
5. Classification and sorting. Sifting classification, sieving machines. Sorting.
6. Filtration.
7. Centrifugation, types of centrifuges and mode of operation, application.
8. Test
9. Cyclones.
10. Pneumatic transport.
11. Constituent elements, circuits and devices, influencing parameters.
12. Flow rate, pipelines, calculation of pressure drop, application.
13. Hydraulic transport. Purpose and basic parts, mixture flow rates, pressure drop.
14. Practical examples.
15. Equipment in mechanical operation systems. Dispensers.

16. Learning methods:

Lectures and exercises with the use of multimedia tools, active learning techniques and with the active participation and discussions of students. Preparation and presentation of group and individual seminar papers. In addition, students have the opportunity to consult with the subject teacher and assistant.

17. Assessment methods:

After half of the semester, students take a written test that covers the topics covered up to that point from lectures and exercises. The test consists of theoretical questions. A student can score a maximum of 30 points on the test. It is necessary to achieve a minimum of 50% of points. After the end of the semester, the student takes a written test if he did not pass it during the semester. As part of the pre-examination requirements, students are required to create an individual or group seminar paper that will cover a certain topic from the content of the course. The seminar paper is submitted in written form to the subject teacher for review and evaluation, and then it is presented orally. A student can obtain a maximum of 30 points for the completed and presented seminar work. Also, for continuous activity in lectures and exercises during the entire semester, a student can earn from 0 to 5 points.The final exam is oral. The maximum number of points that a student can achieve in the oral exam is 35. In order to pass the course, the student must obtain a minimum of 54 cumulative points. For those who do not collect 50% points for passing through the tests, they go to the scheduled dates of the final and remedial exams. The grade is formed according to the number of accumulated points, and according to Article 107 of the Law on Higher Education TK.

Grade	Described	Letter	Points
5 (five)	Does not meet minimum criteria	F, FX	<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 occasional errors	B	85-94
10 (ten)	Exceptional achievement with no errors or with minor errors	A	95-100

18. Assessment components:

Attendance continues 5 points
- Seminar work during the semester 30 points
- Test 30 points
Pre-exam requirements total 65 points
Final exam = 35 points

19. Mandatory reading list:

1. Koharić, V.: Mehaničke operacije, FSB, Zagreb, 1996;
2. Čikić, A.; Kondić, Ž.: Osnove mehaničkih operacija – praktični primjeri, Visoka tehnička škola u Bjelovaru, 2014

20. Additional reading list:

1. E. Džaferović, H. Hadžiahmetović: Pneumatski transport

21. Web sources:

22. Applicable from the academic year:

2023/2024

23. Adopted in the Faculty/Academy session: