

SYLLABUS

1. Course title:

Material Handling I

2. Code:

3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course:

Mandatory

6. Prerequisites:

No prerequisites

7. Class restrictions:

None

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	3			Classes: 67,50
9.2. Seminars	1			Individual work: 112,3
9.3. Laboratory / Practice classes	2			In total: 179,8

10. Faculty:

Faculty of Mechanical Engineering Tuzla

11. Department/study program:

Production Engineering / Production Engineering

12. Lecturer:

Alan Topčić PhD, Full Professor

13. Course aims:

Familiarization with the concept, components, and structure of conventional material handling/transport systems in manufacturing plants/systems. Mastering of modern approaches to the design of conventional material handling/transport systems in manufacturing facilities/systems. Understanding the role of conventional material

handling/transport systems in manufacturing facilities/systems in the execution and flow of production processes, methods of interconnection and coordination of operations, and the integration of individual transport means and devices into the material flow system in industry in accordance with the requirements of the production process.

14. Learning outcomes:

Upon successful completion of the course, the student will be able to:

To understand the operating principles of conventional material handling/transport systems in manufacturing plants/systems; To identify, categorize and understand of the operating principles of components (transport means and devices) of conventional material handling/transport systems in manufacturing plants/systems; To calculate of the technical and technological characteristics of individual components of conventional material handling/transport systems in manufacturing plants/systems; To develop a conceptual design for a conventional material handling/transport system in manufacturing plants/systems; To integrate transport means and devices into a functional conventional material flow system in industry, in accordance with the requirements of production process execution, and implement appropriate solutions into a real manufacturing system.

15. Course content:

1. The concept and definition of material handling/transport systems in industry; The concept and structure of material handling/transport systems in industry;
2. Types of transport and transport means in industrial applications; Conventional and automated transport means and devices;
3. Conventional continuous-type transport means: Belt Conveyor;
4. Conventional continuous-type transport means: Belt Conveyor, Test 1;
5. Conventional continuous-type transport means: Conveyors;
6. Conventional continuous-type transport means: Conveyors;
7. Conventional continuous-type transport means: Elevator, Screw Conveyors;
8. Conventional cyclic-type transport means: Manual industrial vehicles;
9. Conventional cyclic-type transport means: Motorized industrial vehicles, Test 2;
10. Dimensioning of structural elements and technical-technological parameters of conventional transport means of continuous and cyclic type;
11. Transfer and handover segments of material handling/transport systems in industry;
12. Machines and devices for packaging, palletizing, and depalletizing;
13. Cranes and Hoists; Elevators and Cableways;
14. Spiral Conveyors; Inertial Conveyors;
15. Hydraulic and Pneumatic material transport in industry, Test 3.

16. Learning methods:

LECTURES (PR) – Theoretical lectures using multimedia tools, along with active two-way communication between student and professor;

AUDITORIUM EXERCISES (AV) – Solving practical problems and tasks related to the subject matter, with active two-way communication between student and teaching assistant;

LABORATORY EXERCISES (LV) – Work in the laboratory and in the field aimed at acquiring practical skills related to the subject matter; Preparation and presentation of seminar and graphical assignments;

CONSULTATIONS – Additional sessions that allow students to clarify specific segments of the lectures/exercises with the professor or assistant after their completion.

17. Assessment methods:

PRE-EXAM OBLIGATIONS: Students are required to take three written tests from the theoretical part (PR) and two from the auditorium exercises (AV). Theoretical tests are scheduled as follows:

- After the first third of the semester – First midterm,
- After the second third of the semester – Second midterm,
- At the end of the semester – Third midterm.

Auditorium exercise tests are scheduled as follows:

- After the middle of the semester – First midterm,
- At the end of the semester – Second midterm.

The tests cover the material presented up to that point in lectures and exercises. Theoretical tests (PR) consist of multiple-choice questions, short answer questions, and essay-type questions. Students can earn a maximum of 5 points per midterm — totaling 15 points for all three theoretical tests. Auditorium exercise (AV) tests consist of problems solving, and students can earn a maximum of 5 points per test — totaling 10 points. All students take the tests at the same time, ensuring uniform knowledge evaluation and consistent testing conditions.

As part of the pre-exam obligations, students are required to prepare an individual Seminar paper and a Graphical assignment on a topic related to the course content. These must be submitted in written form to the course professor/assistant for review and evaluation, and then defended orally. Each successfully completed and defended Seminar and Graphical assignment is worth up to 5 points.

In addition, students must prepare, submit, and defend a Laboratory Exercise Report, for which they may earn a maximum of 5 points.

For continuous participation during lectures and exercises throughout the semester, students may earn:

- Up to 15 points from lectures,
- Up to 15 points from exercises (5 from auditorium + 10 from laboratory exercises).

The final exam is oral.

Only students who have successfully fulfilled more than 50% of the pre-exam obligations and attended more than 70% of lectures and exercises are eligible to take the final exam. In the final exam, students must answer five questions from the course material covered in lectures and exercises. The maximum score for the final exam is 30 points.

All forms of knowledge assessment are recognized as part of the cumulative grading system. To pass the course, a student must earn a minimum of 54 cumulative points.

If a student misses lectures/exercises, they are required to provide valid justification. The condition for signing is the student's attendance at a minimum of 70% of lectures and exercises.

Grading Scale:

Grade	Descriptive	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 success with no errors or with minor errors	A	95÷100

18. Assessment components:

The exam grade is based on the total number of points that the student has earned by completing the prerequisites and taking the exam, and contains a maximum of 100 points, and is determined according to the following scale:

- Lecture attendance: 15 points
- Theory tests: 3 tests × 5 points = 15 points
- Seminar paper: 5 points
- Auditorium exercises attendance: 5 points
- Laboratory exercises attendance: 10 points
- Tests with assignments: 2 tests × 5 points = 10 points
- Graphic assignment: 5 points
- Laboratory Exercise Report: 5 points

Prerequisites total: 70 points

Final exam: 30 points

TOTAL: 100 points

19. Mandatory reading list:

Vladić J. (2005) „Transportna i pretovarna sredstva i uređaji“, FTN Izdavaštvo, Novi Sad
Dedijer S (2001) „Osnovi transportnih uređaja“, Beograd
Olujčić Č. (1991) „Transport u industriji - rukovanje materijalom“, Sveučilište u Zagrebu, Zagreb

20. Additional reading list:

R. Siddhartha (2017) "Introduction to Material Handling" Paperback
E.H. Frazelle (2016) "World-Class Warehousing and Material Handling" RightChain Incorporated
M.P. Stephens (2013) "Manufacturing Facilities Design & Material Handling", Purdue University Press
D.E. Mulcahy (1998) "Materials Handling Handbook," McGraw-Hill Professional
F.E Meyers (1993) "Plant Layout & Material Handling", Regents/Prentice Hall
T.H. Allegrì (1992) "Materials Handling: Principles and Practice", Krieger Publishing Company

21. Web sources:

<https://onlinelibrary.wiley.com/doi/epdf/10.1002/9780470172490.fmatter>
<https://industri.fatek.unpatti.ac.id/wp-content/uploads/2019/03/140-Manufacturing-Facilities-Design-Material-Handling-Matthew-P.-Stephens-Fred-E.-Meyer-Edisi-5-2013.pdf>
<https://industri.fatek.unpatti.ac.id/wp-content/uploads/2019/03/137-Introduction-to-Materials-Handling-Sidphartha-Ray-Edisi-1-2008.pdf>
<https://industri.fatek.unpatti.ac.id/wp-content/uploads/2019/03/139-Plant-Layout-and-Materials-Handling-A.W.-Pemberton-Edisi-1-1974.pdf>

22. Applicable from the academic year:

2025/2026.

23. Adopted in the Faculty/Academy session:

25.04.2025.

