UNDERGRADUATE STUDY: TRANSPORT, ITS AND LOGISTICS

SEMESTER (V)

Syllabus

Academic year 2023/2024

Course:	**Integral and Intermodal Systems**				
Head of course: Prof. **Nikolina Brnjac**, Ph.D.					
Co-lecturers: Prof. **Jasmina Pašagić Škrinjar**, Ph.D. **Martina Jakara**, MSc Traff. Eng.					
Semester: **W/S**	Course code: **35987**	Lectures: **45**	Auditory exercises: **5**	Seminars: **10**	ECTS credits: **4**
Group for lectures: **30 students**			Group for auditory and laboratory exercises: **30 students**		

Objective of the course:

- Course goal it is for the student to become acquainted to basic terms and structures of intermodal transportation systems
- Introduction to the methodology of planning, management, control, and analysis of all processes in transport chains and intermodal transportation systems

Learning outcomes:

After the completion of the course the students will be able to:

1. Define the role of intermodal transport for various participants and users
2. Define the structure of intermodal system and determine advantages and disadvantages of each system element in specific intermodal transportation chain
3. Analyze classic and intermodal transport chain technology
4. Choose optimal technology in transport chain realization
5. Evaluate basic performance of intermodal transport chain
6. Organize transport in an intermodal transport chain
7. Make conclusions based on calculation and select the optimal solution

LECTURES, EXERCISES and SEMINARS

Week	Syllabus	Form of classes	Performed by	Lessons	Remark
1.	▪ Introductory lecture (familiarization with the course, literature and expectation of the student) ▪ General concepts and definition of modern transport technology	L	Jasmina P. Škrinjar	3	
	▪ Analysis of the development of intermodal transport	S	Martina Jakara	1	
2.	▪ The reasons for the development of intermodal transport ▪ Phases, terms and entities in the transport process ▪ Transport chain/ECMT in intermodal transport	L	Jasmina P. Škrinjar	3	
	▪ Analysis of CT (Container Terminal) Vrapče	S	Martina Jakara	1	
3.	▪ Containerization and palletization	L	Jasmina P. Škrinjar	3	Quick test-check of understanding the terms of intermodality, interconnectivity and interoperability.
	▪ Calculation of the number of pallets and forklifts	AE	Martina Jakara	1	
4.	▪ Technological features of modern transport technology in rail transport	L	Jasmina P. Škrinjar	3	
	▪ Commercial transport velocity	AE	Martina Jakara	1	

5.	▪ Technological features of modern transport technology in road transport	L	Jasmina P. Škrinjar	3	Quick test
	▪ Calculation of required number of containers	AE	Martina Jakara	1	
6.	▪ Huckepack technology	L	Jasmina P. Škrinjar	3	
	▪ Calculation of required number of road vehicles	AE	Martina Jakara	1	
7.	▪ Bimodal technology (field lectures)	L	Jasmina P. Škrinjar	3	
	▪ Calculation of capacity of the container terminal (static and dynamic capacity)	AE	Martina Jakara	1	
8.	▪ Technical and technological features of intermodal transport technology in inland waterways	L	Jasmina P. Škrinjar	3	
	▪ Planning the location of inland water terminals	S	Martina Jakara	1	Preliminary Exam I
9.	▪ Technical and technological features in intermodal transport technology in shipping	L	Jasmina P. Škrinjar	3	
	▪ Analysis of terminal in the Port of Rijeka	S	Martina Jakara	1	
10.	▪ Technical and technological features in intermodal transport technology in air transport	L	Jasmina P. Škrinjar	3	

	▪ Analysis of terminal in the Port of Ploče	S	Martina Jakara	1	Quick test
11.	▪ Intermodal terminals	L	Jasmina P. Škrinjar	3	
	▪ Optimization of intermodal terminals	S	Martina Jakara	1	
12.	▪ Technical and technological features in intermodal transport technology in postal traffic	L	Jasmina P. Škrinjar	3	
	▪ Capacity planning of intermodal terminals	S	Martina Jakara	1	
13.	▪ Cargo Centres and free zone	L	Jasmina P. Škrinjar	3	
	▪ Analysis of Cargo Centre – a case study	S	Martina Jakara	1	
14.	▪ Intermodal Cargo Centres and free zone	L	Jasmina P. Škrinjar	3	
	▪ Analysis of Intermodal Cargo Centre – a case study	S	Martina Jakara	1	
15.	▪ Transport corridors	L	Jasmina P. Škrinjar	3	Preliminary Exam II
	▪ Examples of analysis study and projections of intermodal flows	S	Martina Jakara	1	

L = Lectures; **AE** = Auditory Exercises; **LE** = Laboratory Exercises; S = Seminars

STUDENT OBLIGATIONS AND EXAMS

Requirements for completed course:

Attendance: a student should attend at least 50% of lectures and 50% of exercises.

Written exam:
Students can take written exams in two ways:

a) **In two parts through preliminary exam**: the first preliminary exam is held in the middle of semester, and the second at the end of the semester. Maximum points that which a student can get in one preliminary exam is 10. Students who don't obtain at least 5 points at one preliminary exam didn't pass the preliminary exam, so those students will have to get points for the written exam in the final written part of the exam. Preliminary exams are available to all the students who take classes regularly (min 50%).
b) **In one part through written final exam**: On the written part of the exam a student can obtain 10 points. Students who obtain less than 50% of maximum points didn't pass the written part of the exam. All the students who don't have enough points on both preliminary exams, aren't satisfied with collected points, or didn't take the preliminary exams have to take the written part of the exam.

Oral exam: To attend the oral part of the exam it is necessary to obtain the minimum of 5 points through both preliminary exams or though the written final exam.

Seminar works (mandatory): The students independently prepare a seminar work, independently studying the recent professional and scientific literature, and finally present the seminar work in lecturer's consultations with the aim of achieving learning outcomes 1, 3, 4 and 6.

COURSE MATERIALS

a) Obligatory literature:

1. Brnjac, N.: **Intermodalni transportni sustavi**, FPZ, 2012
2. Rodrigue, J.P: **The Geography of transport systems**, Routledge, New York, USA, 2020

b) Recommended literature:

1. Lowe D.: **Intermodal Freight Transport**, Elsevier, 2005.
2. Woxenius, J.: **Development of small-scale intermodal freight transportation in a system context**, Sweden, 1998.
3. Koch J.: **Die Entwicklung des Kombinierten Verkehrs**, DUV, Gabler, 1997.
4. Notteboom, T., A. Pallis and J-P Rodrigue (2021) **Port Economics, Management and Policy**, New York: Routledge.

METHODOLOGY OF THE IMPLEMENTATION OF THE COURSE PLAN

1. LECTURES

The lectures follow themes presented in authorized lectures given in compulsory literature, and are mostly presented to students by Power Point presentation and a board. For some units there are video presentations. Also during the lectures, discussions are encouraged on the issue which is being presented. On the seminars students are divided into groups and through debate they elaborate on the chosen essay subject.

2. AUDITORIAL EXERCISES

Exercises are performed by solving numerical tasks so that the students would be trained to plan, manage, control and analyze processes in the transport chains and intermodal transport systems. The Seminars follow the materials presented on lectures and they are performed on examples from the practice.

3. DOCUMENTATION

Records are kept of the attendance at the lectures, exercises, and seminars. As well as quick tests and exams together with the results of mid-term and end-term tests, and final exams.

4. SCORING SYSTEM

Table 1 The scoring system for the monitoring of students and explained credit values in ECTS credits

Activity /segment		ECTS points	
Lectures +Exercises +seminar			**1,5**
1st preliminary exam	= written exam	1	**1**
2nd preliminary exam		1	
Oral exam			**1**
Field lectures			**0.5**
Total:			**4**

Assessment and evaluation of students during lectures and on final exam:
The final grade is formed on the basis of the sum of points obtained on the written and oral parts of the exam, and completed essay.

Table 2 Explanation of the credit values in evaluations

Total Sum of Points	Grade
10	Excellent (5)
8 - 9	Very good (4)
7 - 8	Good (3)
5 - 6	Sufficient (2)

Note: Individual and/or group viewing negative written test

Individual at the time of consultation or a designated period after each colloquium and / or written exam. If necessary and at the request of a group of students in the form post exam exercises in order to explain the most common mistakes typical, after discussion with the team responses to individual student issues.

Information for students (scoring system, implementation plan, learning outcomes, syllabus, literature, consulting teachers, announcement of results of examinations or colloquium, and all other information):

- **https://moodle.srce.hr/2020-2021/**
- **http://www.fpz.unizg.hr**

Student assistants: Additional individual work with the students through individual consultations for assignments from auditory exercises and / or research designs from laboratory exercises, for optional homework, as well as for insight into the negatively written part of the exam.