UNDERGRADUATE STUDY: TRANSPORT

SEMESTER (II)

Syllabus

Academic year 2025/2026

Course:	**Traffic Control Devices and Road Equipment**					
Head of course: Prof. **Darko Babić**, Ph.D.						
Co-lecturers: Asst. Prof. **Dario Babić**, Ph.D. **Mario Fiolić**, Ph.D. **Ivana Kučina**, MSc traff. eng						
Semester: **W/S**	Course code: **60634**	Lectures: **30**	Auditory exercises: **0**	Laboratory exercises: **15**	Seminars: **0**	ECTS credits: **4**
Group for lectures: **15 students**			Group for auditory and laboratory exercises: **15 students**			

Objective of the course:

- To provide the knowledge necessary to understand the importance of traffic control devices and road equipment in road traffic and the adoption of concepts, methods, and procedures for the correct application of traffic control devices and road equipment with the aim of increasing road safety.

Course enrolment requirements:

Learning outcomes:

1. Differentiate basic terms, elements, and contemporary technologies for traffic control devices and road equipment.
2. Review the characteristics of specific types of materials used for traffic control devices and road equipment.
3. Determine the importance/role of traffic control devices and road equipment for road safety.
4. Compare the basic methods for testing the quality of traffic control devices and road equipment.
5. Analyze the results of quality testing of traffic control devices and road equipment with the aim of assessing their quality.
6. Connect the requirements from the legal regulations when creating projects related to traffic control devices and road equipment.

LECTURES, EXERCISES and SEMINARS

Week	Syllabus	Form of classes	Performed by	Lessons	Remark
1.	▪ Basics of visibility in road traffic. Types of reflection and retroreflection of light	L	Darko Babić		
	▪ Reflection and retroreflection - laboratory demonstrations	LE	Ivana Kučina		
2.	▪ Classification of traffic control devices and road equipment and review of regulatory requirements related to traffic control devices and road equipment	L	Dario Babić		
	▪ Calculation of luminous flux, light intensity, illumination, brightness and retroreflection	LE	Mario Fiolić		
3.	▪ Road signs and their function	L	Darko Babić		
	▪ Visual perception of traffic control devices in conditions of impaired visibility (demonstration on a driving simulator)	LE	Ivana Kučina		
4.	▪ Materials for production of road signs	L	Darko Babić		
	▪ Analysis of regulatory requirements related to road signs (Regulation on road signs, signalling and road equipment, Croatian and EU standards)	LE	Ivana Kučina		
5.	▪ Road markings and their function	L	Dario Babić		

	▪ Comparison of retroreflective materials for road signs - laboratory demonstrations	LE	Mario Fiolić		
6.	▪ Materials for road markings	L	Darko Babić		
	▪ Quality testing of road signs (testing of colorimetry and retroreflection of road signs, as well as mechanical properties of elements for erecting and installing road signs, preparation of a report) - laboratory demonstration	LE	Mario Fiolić		
7.	▪ Variable road signs	L	Dario Babić		
	▪ Testing the quality of road signs (testing the colorimetry and retroreflection of road signs) - field demonstration	LE	Mario Fiolić		
8.	▪ Quality testing of road signs and markings	L	Darko Babić		
	▪ Testing the quality of road markings (comparison and presentation of static and dynamic test methods, colorimetry and retroreflection testing of road markings, preparation of reports) - laboratory demonstration	LE	Dario Babić		
9.	▪ Classification and role of road equipment	L	Dario Babić		
	▪ Testing the quality of road markings (testing the colorimetry and retroreflection of road markings) - field demonstration	LE	Ivana Kučina		

10.	▪ Guardrails (basic terms, classification, testing and attestation methods)	L	Darko Babić		
	▪ Application of the GIS database for the purpose of optimization of maintenance activities related to traffic control devices	LE	Ivana Kučina		
11.	▪ Crash cushions and terminals (basic terms, classification, testing and attestation method)	L	Dario Babić		
	▪ Project task related to the application and establishment of the temporary traffic regulation (preparation of the temporary traffic regulation project)	LE	Ivana Kučina		
12.	▪ Temporary traffic regulation (basic concepts and procedures for implementing temporary regulation)	L	Darko Babić		
	▪ Project task related to the optimization of the maintenance activities related to road signs	LE	Dario Babić		
13.	▪ Systematic management and maintenance of traffic control devices and road equipment. GIS Database on to traffic control devices and road equipment	L	Dario Babić		
	▪ Project task related to the optimization of the maintenance activities related to road markings	LE	Mario Fiolić		
14.	▪ Communication between automated vehicles and traffic control devices and road equipment	L	Dario Babić		
	▪ Project task related to the design of guardrails, crash cushions and terminals	LE	Ivana Kučina		

15.	▪ The future of traffic control devices and road equipment	L	Darko Babić		
	▪ Analysis of the impact of traffic control devices and road equipment on driver assistance systems - field demonstration	LE	Mario Fiolić		

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

STUDENT OBLIGATIONS AND EXAMS

Conditions for obtaining signatures:

Students are required to attend lectures and exercises. In case of more than 3 absences from the lectures or more than 3 absences from the exercises, students lose the right to register for the exam. The contents of the lectures are based on the chapters of the specified compulsory literature, depending on the topic, so that it is possible to prepare for the lectures and repeat the material after listening to the lecture.

Two colloquia are planned during the semester, each of which will be graded for 50 points (a total of 100 points can be earned during the semester). The colloquia will consist of theoretical questions and/or numerical assignments. Students scoring 60 points or more (at least 60% of the maximum score) are exempted from the written part of the exam according to the following evaluation criteria: 60 - 70 points (sufficient-2); 71 - 80 points (good-3); 81 - 90 points (very good-4); 91 - 100 points (excellent-5). The oral exam is compulsory for all students.

Written Examination:

Class attendance – 1,5 ECTS-a
Continuous assessment of knowledge – 0-1,5 ECTS-a
Practical work – 0,5 ECTS-a
Written exam – 0-1,5 ECTS-a
Oral exam – 0,5 ECTS-a

There are two ways of passing the exam:

1. in two parts via a **preliminary exam**: the first preliminary exam is held midway through the semester, and the second at the end of the semester. The maximum number of points a student can achieve in one preliminary exam is 50. Students who achieve less than 30 points per preliminary exam have not passed the preliminary exam and will need to achieve the points for the written knowledge test in the final written part of the exam. Students who achieve less than 60 points in both preliminary exams have not passed the written part of the exam. The first preliminary exam is open to all students who regularly attend classes (min 80%). The second preliminary exam is open to students who have passed the first preliminary exam.
2. in one part via a written **final exam**: 100 points can be achieved in the written exam. Students who achieve less than 60 points have not passed the written part of the exam. The written part of the exam is taken by all students who did not collect enough points individually in the preliminary exams or are not satisfied with the points collected in the preliminary exams or did not attend the written knowledge assessment through the preliminary exam.

Oral examination:

To attend the oral part of the exam, it is necessary to achieve a minimum of 60 points either through two preliminary exams or a written exam.

LITERATURE

a) Obligatory literature:

1. Ščukanec A. *Signalizacija i oprema u cestovnom prometu*. Zagreb: Fakultet prometnih znanosti; 2023.

b) Recommended literature:

1. Olson P. *Forensic Aspects of Driver Perception and Response* (4th Edition). Tucson, Arizona, SAD: Lawyers&Judges Publishing Company, Inc.;2015.

METHODOLOGY OF THE IMPLEMENTATION OF THE COURSE PLAN

1. LECTURES

Lectures on the accompanying material are presented in authorized lectures (presentations and scripts) listed in the mandatory literature and are mostly conducted with the use of Power Point presentations and boards. Video presentations are used for some units. Students are encouraged to study the publication of teaching materials and other literature before the lecture in order to be able to actively participate in the discussion of the issues being taught.

2. LABORATORY EXERCISES

Laboratory exercises are performed in a way that "case-study" examples are passed so that students understand the issues and are trained for simpler calculations and testing the quality of traffic signs and markings on the roadway, as well as methods of installing and maintaining traffic signals.

Note: Individual and/or group viewing negative written test

3. DOCUMENTATION

Attendance at lectures and laboratory exercises is recorded. Achievements (achievement of goals) during the semester are recorded through the ISVU system module - continuous monitoring.

4. SCORING SYSTEM

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

no	Segment:		Required credits to be achieved: Min.	Required credits to be achieved: Max.	Remark:	ECTS credits
1.	Presence at the lectures					**1**
2.	Presence at the exercises (auditory and laboratory)					**1**
3.	Seminar					**0**
4.	First colloquium	= Written exam				**0,5**
5.	Second colloquium					**0,5**
6.	Oral exam					**1**
Σ	*Overall points:*				*Overall ECTS points:*	**4**

*During the course the student is evaluated based on the sum of the internal points earned through participating in class (lectures and exercises) and grading the seminar work. The student, in order to realize the condition "courses requirements achieved", must achieve a minimum of 30 points.

Table 2 - Explanation of the credit values in evaluations

CREDITS:	Estimate based on attendance, seminar paper and two colloquies (or written exam) - [4 ECTS]*:	The final score [4 ECTS]*:
60-70	Sufficient (2)	
71-80	Good (3)	
81-90	Very good (4)	
91-100	Excellent (5)	

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/2025-2026/ (https://merlin.srce.hr)**
- **http://www.fpz.unizg.hr/isvu/2025-en/**

Student assistants: