



**GRADUATE STUDY: TRANSPORT**

**SEMESTER (II)**

**Syllabus**

Academic year 2025/2026

|                                                         |                               |                        |                                                                    |                                   |                       |                           |
|---------------------------------------------------------|-------------------------------|------------------------|--------------------------------------------------------------------|-----------------------------------|-----------------------|---------------------------|
| Course: <b>Data Collection Methods in Road Traffic</b>  |                               |                        |                                                                    |                                   |                       |                           |
| Head of course: Asst. Prof. <b>Dario Babić</b> , Ph. D. |                               |                        |                                                                    |                                   |                       |                           |
| Co-lecturers:                                           |                               |                        |                                                                    |                                   |                       |                           |
| Semester:<br><b>S</b>                                   | Course code:<br><b>283259</b> | Lectures:<br><b>30</b> | Auditory<br>exercises: <b>30</b>                                   | Laboratory<br>exercises: <b>0</b> | Seminars:<br><b>0</b> | ECTS credits:<br><b>4</b> |
| Group for lectures:<br><b>15 students</b>               |                               |                        | Group for auditory and laboratory exercises:<br><b>15 students</b> |                                   |                       |                           |

**Objective of the course:**

- To familiarize students with the basics of collecting, interpreting, and presenting data in road traffic.

**Course enrolment requirements:**

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**Learning outcomes:**

1. Identify the motives, reasons, and necessity of data collection in road traffic.
2. Differentiate and compare appropriate methods and technologies for data collection in road traffic.
3. Select appropriate method and technology of data collection in road traffic, taking into account the advantages and disadvantages of each method and the specificity of the observed problem.
4. Analyse the quality and relevance of the collected data.
5. Select an appropriate way of presentation and visualization of the collected data with the aim of conveying their fundamental characteristics.



**LECTURES, EXERCISES and SEMINARS**

| Week | Syllabus                                                                                                   | Form of classes | Performed by | Lessons | Remark |
|------|------------------------------------------------------------------------------------------------------------|-----------------|--------------|---------|--------|
| 1.   | ▪ Reasons and motives for collecting data in road traffic                                                  | L               | Dario Babić  |         |        |
|      | ▪ Procedures for collecting road data with traffic counters - examples of good practices                   | AE              | Dario Babić  |         |        |
| 2.   | ▪ Types and characteristics of road traffic data                                                           | L               | Dario Babić  |         |        |
|      | ▪ Manual traffic counting - field demonstration                                                            | AE              | Dario Babić  |         |        |
| 3.   | ▪ Methods of collecting data on the intensity and distribution of motor vehicles                           | L               | Dario Babić  |         |        |
|      | ▪ Basic elements, operation and installation of radar counters and magnetic counters - field demonstration | AE              | Dario Babić  |         |        |
| 4.   | ▪ Methods of collecting data on the speed of traffic flow of motor vehicles                                | L               | Dario Babić  |         |        |
|      | ▪ Analysis of the cost, suitability, reliability, and accuracy of traffic counting methods                 | AE              | Dario Babić  |         |        |
| 5.   | ▪ Methods for collecting data on queues                                                                    | L               | Dario Babić  |         |        |



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|     |                                                                                                                                                                   |    |             |  |  |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-------------|--|--|
|     | <ul style="list-style-type: none"> <li>Analysis and presentation of data collected by traffic counters</li> </ul>                                                 | AE | Dario Babić |  |  |
| 6.  | <ul style="list-style-type: none"> <li>Methods for collecting data on public transport of passengers</li> </ul>                                                   | L  | Dario Babić |  |  |
|     | <ul style="list-style-type: none"> <li>Conversion of peak hour traffic to average daily traffic, average daily traffic to annual average daily traffic</li> </ul> | AE | Dario Babić |  |  |
| 7.  | <ul style="list-style-type: none"> <li>Methods for collecting data on active modes of transportation</li> </ul>                                                   | L  | Dario Babić |  |  |
|     | <ul style="list-style-type: none"> <li>Preparation of a report on the counting of road traffic</li> </ul>                                                         | AE | Dario Babić |  |  |
| 8.  | <ul style="list-style-type: none"> <li>Methods for collecting data on road infrastructure</li> </ul>                                                              | L  | Dario Babić |  |  |
|     | <ul style="list-style-type: none"> <li>Calculation of speed of traffic flow of motor vehicles</li> </ul>                                                          | AE | Dario Babić |  |  |
| 9.  | <ul style="list-style-type: none"> <li>Methods for collecting data on road safety</li> </ul>                                                                      | L  | Dario Babić |  |  |
|     | <ul style="list-style-type: none"> <li>Collection of data on mass and axle load in road traffic - examples of good practice</li> </ul>                            | AE | Dario Babić |  |  |
| 10. | <ul style="list-style-type: none"> <li>Methods for collecting data on behaviour of road users</li> </ul>                                                          | L  | Dario Babić |  |  |
|     | <ul style="list-style-type: none"> <li>Analysis of the database on road crashes in the Republic of Croatia</li> </ul>                                             | AE | Dario Babić |  |  |



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|     |                                                                                                                                                |    |             |  |  |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------|----|-------------|--|--|
| 11. | ▪ Methods for collecting data on mass and axle load in road traffic                                                                            | L  | Dario Babić |  |  |
|     | ▪ Application of driving simulators and eye-tracking methods for collecting data on driver behavior in road traffic - laboratory demonstration | AE | Dario Babić |  |  |
| 12. | ▪ Methods for collecting data on meteorological conditions on the roads                                                                        | L  | Dario Babić |  |  |
|     | ▪ Digital data registers for road traffic - examples of good practice                                                                          | AE | Dario Babić |  |  |
| 13. | ▪ Collection of data on passenger and freight traffic                                                                                          | L  | Dario Babić |  |  |
|     | ▪ Application of large data sets ("Big Data") to collect data on passenger and freight traffic - laboratory demonstration                      | AE | Dario Babić |  |  |
| 14. | ▪ Analysis and processing of the collected data – descriptive statistics                                                                       | L  | Dario Babić |  |  |
|     | ▪ Calculation of basic indicators of descriptive statistics                                                                                    | AE | Dario Babić |  |  |
| 15. | ▪ Analysis and processing of the collected data – inferential statistics                                                                       | L  | Dario Babić |  |  |
|     | ▪ Calculation of basic indicators of inferential statistics                                                                                    | AE | Dario Babić |  |  |

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.

### Written Examination:

#### There are two ways of passing the exam:

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).

#### Written exam scoring:

| POINTS   | GRADE            |
|----------|------------------|
| 0 - 59   | insufficient (1) |
| 60 - 70  | sufficient (2)   |
| 71 - 80  | good (3)         |
| 81 - 90  | very good (4)    |
| 91 - 100 | excellent (5)    |

### Oral examination:

The oral exam is compulsory for all students.



## LITERATURE

### a) Obligatory literature:

1. Ohidul Haque M. Data collection, analysis, monitoring and countermeasure evaluations with cases. Lanham, Maryland, SAD, Rowman & Littlefield, 2008.

### b) Recommended literature:

1. Sandra M, Ahac M, Ahac S, Šimun M. Overview of emerging road traffic data collection methods. Proceeding of 6th International Conference on Road and Rail Infrastructure. 2021:797-803. <https://doi.org/10.5592/CO/cetra.2020.1210>
2. National Cooperative Highway Research Project (NCHRP) Report 538. Traffic data collection, analysis, and forecasting for mechanistic pavement design. Washington, DC: The National Academies Press, 2004.

## METHODOLOGY OF THE IMPLEMENTATION OF THE COURSE PLAN

### 1. LECTURES

The lectures follow the material presented in the authorized lectures (presentations and scripts) listed in the mandatory literature, and are mostly conducted with the use of Power Point presentations and whiteboards. Video presentations are used for some units. Students are encouraged to study the published teaching materials as well as other literature before the lecture so that they can actively participate in the discussion of the issues being taught.

### 2. AUDITORY EXERCISES

Auditory exercises are performed in a way that good practices examples are passed so that students understand the issues and are trained for analysis and process data and application of large data sets in traffic. The field demonstration covers the basic elements, operation and installation of manual counters and magnetic traffic counters.

**Note: Individual and/or group viewing negative written test**



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### 3. DOCUMENTATION

### 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: |      | Remark:              | ECTS credits |
|----|-----------------------------------------------------|----------------|----------------------------------|------|----------------------|--------------|
|    |                                                     |                | Min.                             | Max. |                      |              |
|    |                                                     |                |                                  |      |                      |              |
| 1. | Presence at the lectures                            |                | 0                                | 2    |                      |              |
| 2. | Presence at the exercises (auditory and laboratory) |                | 0                                | 1    |                      |              |
| 3. | Seminar                                             |                | 0                                | 0    |                      |              |
|    |                                                     |                |                                  |      |                      |              |
| 4. | First colloquium                                    | = Written exam |                                  |      |                      |              |
| 5. | Second colloquium                                   |                |                                  |      |                      |              |
| 6. | Oral exam                                           |                |                                  |      |                      |              |
| Σ  | Overall points:                                     |                |                                  |      | Overall ECTS points: |              |

\*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,<br>seminar paper and two<br>colloquies (or written exam)<br>- [4 ECTS]*: | The final score<br>[4 ECTS]*: |
|----------|--------------------------------------------------------------------------------------------------------|-------------------------------|
|          | Sufficient (2)                                                                                         |                               |
|          | Good (3)                                                                                               |                               |
|          | Very good (4)                                                                                          |                               |
|          | 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:**