

DESCRIPTION OF A STUDY COURSE – SYLLABUS

| | | | | | |
|---|---|-----------------|--|---------------------|---|
| Title of a course | Signalling and Automation in Railroad Transport | | | | |
| Head of course | PhD Saša Hirnig, College Professor | | | | |
| Study programme | Professional undergraduate study Railroad Transport | | | | |
| Status of a course | Obligatory | | | | |
| Year of study | 3. | Semester | V | ECTS credits | 4 |
| Teaching plan (L + E + S+ Pr) | 2+1+0+0 | | | | |
| Goals of a course | | | | | |
| Introduce students to signaling and safety techniques in railway traffic and to point out the possibility of applying new technologies in railway traffic management. | | | | | |
| Conditions for enrolling course | | | | | |
| No conditions | | | | | |
| Learning outcomes on a level of a study programme which includes course | | | | | |
| <p>Outcome 4: Analyse and evaluate the economic aspect in the traffic engineering practice.</p> <p>Outcome 8: Recommend effective solutions for railroad transport system planning based on sustainable development principles.</p> <p>Outcome 9: Link engineering principles and technical principles in transport systems.</p> <p>Outcome 10: Assess models of exploitation and maintenance of technical equipment in the transport system.</p> <p>Outcome 12: Participate in the development of professional projects in railroad transport.</p> | | | | | |
| Expected learning outcomes on a level of a course | | | | | |
| <ol style="list-style-type: none"> 1. Substantiate the importance and role of signalization in rail transport. 2. Analyse the principle of operation of individual types of SS devices. 3. Analyse the principle of operation of the external elements of SS devices. 4. Comment on the purpose of each SS device and its sub-systems 5. Identify the possibilities and the need to apply new technologies in the automation of railroad transport management and regulation. | | | | | |
| Content of a course | | | | | |
| Rail transport signalling equipment. Signal types, light colours, optical systems, signal installation and adjustment. Points, points types and features, installation and fastening. Skids. Points heating. Rail and points check-ups, isolated sections. Rail contacts. Power facilities. Interdependence table. Railway station central control. Shunting yard facilities. Locomotive signalling. Automatic section block. Road crossing security. Rail telecommunications. Remote control. Automatic control. Digital control fundamentals. | | | | | |
| Teaching modes | <input checked="" type="checkbox"/> lectures <input type="checkbox"/> auditory exercises <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> distance learning <input type="checkbox"/> field classes | | <input checked="" type="checkbox"/> individual assignments <input type="checkbox"/> multimedia and network <input type="checkbox"/> laboratory <input type="checkbox"/> supervisor's work <input type="checkbox"/> other _____ | | |
| Comments | | | | | |
| Students' obligations | | | | | |
| | | | | | |
| Grading, evaluation and monitoring of students' work continuously during lectures and exams | | | | | |
| Grading is based upon evaluation of course's learning outcomes' adoption. Grading is performed continuously during lectures and/or during exam, in compliance with the provisions of Regulation on the assessment of students. | | | | | |

Continuous check-up:

| Outcomes | Pre-exam 1 | Pre-exam 2 | Field assignments | Assignments | Threshold | Max |
|-----------------------|---------------|---------------|----------------------|-------------|-----------|-------|
| Outcome 1 | 15 | | | | 8 | 15 |
| Outcome 2 | 10 | 7 | 4 | 4 | 13* | 25 |
| Outcome 3 | 20 | | 5 | 5 | 15* | 30 |
| Outcome 4 | | 12 | | | 6 | 12 |
| Outcome 5 | 9 | 9 | | | 9 | 18 |
| Percentage of ECTS | 2 | 1,4 | 0,4 | 0,2 | | |
| Total | | | | | 50 % | 100 % |

*of which a minimum of 50% must be obtained at the pre-exams, the resolution of each pre-exam must be at least 40%

A student has passed the exam if he has acquired a percentage of credits for each learning outcome higher or equal to defined threshold.

Exam term:

| Outcomes | Written exam | Oral exam | Max |
|-----------------------|-----------------|-----------|-------|
| Outcome 1 | 5 | 10 | 15 |
| Outcome 2 | 15 | 10 | 25 |
| Outcome 3 | 20 | 10 | 30 |
| Outcome 4 | 6 | 6 | 12 |
| Outcome 5 | 8 | 10 | 18 |
| Percentage of ECTS | 2 | 2 | |
| Total | 54 | 46 | 100 % |

A student has passed the exam if he has acquired a percentage of credits for each learning outcome higher or equal to defined threshold.

Grading:

A student has passed the exam if he has acquired at least 50% of anticipated credits of a specific learning outcome.

If a student has passed learning outcomes of all courses, the accomplished credits (percentages) of all passed learning outcomes are being added, while the final grade is defined upon following table:

| Range of credits (percentages) | Numerical grade | ECTS grade |
|-----------------------------------|------------------|------------|
| 90,00 – 100,00 | Excellent (5) | A |
| 75,00 – 89,99 | Very good (4) | B |
| 60,00 – 74,99 | Good (3) | C |
| 50,00 – 59,99 | Sufficient (2) | D |
| 0,00 – 49,99 | Insufficient (1) | F |

Obligatory literature

1. Toš, Z.: Signalizacija u željezničkom prometu, FPZ, 2013.,

Additional literature

1. Toš, Z.: Signalizacija i automatizacija u željezničkom prometu, FPZ, Zagreb, 2003.
2. Kos V., Mlinarić T., Arhanić Lj.: Signalno-sigurnosni i telekomunikacijski uređaji u željezničkom prometu, FPZ, Zagreb, 1988.

