

DESCRIPTION OF A STUDY COURSE – SYLLABUS

Title of a course	Rolling Stock and Train Hauling				
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					
Acquiring basic knowledge of rolling stock and towing vehicles and the conditions and principles of their operation.					
Conditions for enrolling course					
No conditions					
Learning outcomes on a level of a study programme which includes course					
Outcome 1: Use mathematical and statistical methods in traffic engineering and traffic research. Outcome 3: Use standards that cover the subject area when designing transport projects and implementing technological and service processes in the field of railroad transport. Outcome 9: Link engineering principles and technical principles in transport systems. Outcome 10: Assess models of exploitation and maintenance of technical equipment in the transport system.					
Expected learning outcomes on a level of a course					
<ol style="list-style-type: none"> 1. Compare the types of railroad vehicles and individual series of freight cars. 2. Analyse the basic assemblies of railroad vehicles. 3. Categorize driving resistance in the calculation of train traction and determine the regular traction mass of locomotives. 4. Describe the characteristics and mode of operation of the brakes on railroad vehicles, and calculate the required and actual braking mass of a train 					
Content of a course					
Term meaning, types and classification of rolling stock. Hauling means. Diesel hauling means. Electrical hauling means. Means hauled. Passenger coaches. Term meaning and rolling stock brake type classification. Brake use basic conditions. Locomotive and wagon braking systems. Hauling means power. Drive resistance. Interdependence of hauling power and adhesion weight. Hauling passport. i-V chart. Q-V chart. Longitudinal rail profile simplification. Train braking system. Train moving equation. Train running chart. Power consumption computation. Rolling stock maintenance.					
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 I	Pre-exam 2	Assignments	Field assignments	Threshold	Max
Outcome 1	5	10		5	10	20
Outcome 2	25			5	15	30
Outcome 3		16	8		12	24
Outcome 4		18	8		13	26
Percentage of ECTS	1,5	1,5	0,6	0,4		
Total	30%	44%	16%	10%	50 %	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.

Exam term:

Outcomes	Written exam	Oral exam	Max
Outcome 1	10	10	20
Outcome 2	20	10	30
Outcome 3	20	4	24
Outcome 4	20	6	26
Percentage of ECTS	3	1	
Total	70	30	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. Zavada, J.: Željeznička vozila i vuča vlakova, FPZ, Zagreb, 1991./2004.,

Additional literature

1. Švaljek, I., Kožulj, T., Bošnjak, M.: Tehničko-eksploatacijski pokazatelji i značajke vučnih vozila Hrvatskih željeznica, HŽ, Zagreb, 2003.

