

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Construction
1.3	Department	Railways, Roads and Bridges
1.4	Field of study	Civil Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	IIT/ Transport Infrastructure Engineering
1.7	Form of education	Full time
1.8	Subject code	9.00

2. Data about the subject

2.1	Subject name	Specific problems concerning railway infrastructure and superstructure									
2.2	Subject area	Civil Engineering									
2.3	Course responsible/lecturer	Prof. dr. ing. Gavril Kollo – Gavril.KOLLO@infra.utcluj.ro									
2.4	Teachers in charge of seminars	Prof. dr. ing. Gavril Kollo – Gavril.KOLLO@infra.utcluj.ro									
2.5	Year of study	I	2.6	Semester	2	2.7	Assessment	E	2.8	Subject category	DA/DI

3. Estimated total time

3.1	Number of hours per week	3	3.2	of which, course:	2	3.3	applications:	1
3.4	Total hours in the curriculum	100	3.5	of which, course:	28	3.6	applications:	14
Individual study								hours
Manual, lecture material and notes, bibliography								20
Supplementary study in the library, online and in the field								18
Preparation for seminars/laboratory works, homework, reports, portfolios, essays								6
Tutoring								2
Exams and tests								2
Other activities								
3.7	Total hours of individual study			58				
3.8	Total hours per semester			100				
3.9	Number of credit points			4				

4. Pre-requisites (where appropriate)

4.1	Curriculum	Railways. Resistance of materials
4.2	Competence	Dynamics, Statics, Autocad

5. Requirements (where appropriate)

5.1	For the course	Cluj-Napoca, str. Observatorului, Nr. 72-74 - OA4, OA5
5.2	For the applications	Cluj-Napoca, str. Observatorului, Nr. 72-74 – Railways Lab, O5

6. Specific competences

Professional competences	Acquiring knowledge on: - General knowledge regarding railway design After completing the discipline students will be able to know: - construction and calculation bases for the railway constructive elements
Cross competences	Discuss the solutions with the colleagues in the working group (semigroup); dissemination of results.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Development of skills regarding the design of construction elements of railway works.
7.2	Specific objectives	Design of different railway superstructures.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
Introductory concepts. Railroad route. New concept of route design.	Exposition, discussions	Video projector + explanations on the board
Railway infrastructure - particularities.		
Elastic rail superstructures.		
Rigid rail superstructures.		
Special rail superstructures. Maglev type superstructures.		
Railway path geometry for high speeds.		
Higher-order kinematic features.		
Calculation of geometric elements.		
Types of progressive curves.		
The behaviour of the railway superstructures upon variable requests.		
Determining the stochastic demands of the rails.		
Fatigue of the railway track.		
Dynamic railway track calculation.		
Determination of vibrations in the railway track.		
Bibliography Modern Railway Track- Conraad Esveld, Delft University of Tehnology 2001 Transrapid und Rad-Schiene-Hoch-Goschwindigkeitsbahn Rainer Schack, Peter Jehb, Rane Naumann, Berlin 2006 Căi ferate, Bernhard Lichtberger, Linez 2003		

Căi ferate, Nechita M., Kollo G., ED. UTC-N 1981		
8.2. Applications/Seminars	Teaching methods	Notes
Calculation of the bearing capacity of the earthwork.	Exposition, discussions	Video projector + explanations on the board
Determining the demands of the elastic rail superstructure elements.		
Determining the demands of the rigid rail superstructure elements.		
Calculation of curves elements. Sizing and geometric checking.		
Calculation of variable requests.		
Determining the specific achievements of the rails. Dynamic railway track calculation.		
The characteristics of the oscillating system. Dynamic amplification functions.		
Bibliography Modern Railway Track- Conraad Esveld, Delft University of Tehnology 2001 Transrapid und Rad-Schiene-Hoch-Goschwindigkeitsbahn Rainer Schack, Peter Jehb, Rane Naumann, Berlin 2006 Căi ferate, Bernhard Lichtberger, Linez 2003		

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The skills acquired will be needed for the employees who work within the framework railway design and maintenance services.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	3 questions	Written exam: 2 hours	100%
10.5 Applications	Each stage of the project will be presented weekly. Questions, justifications, proposals to improve the proposed project.	Oral exam: 30 min.	A/R
10.6 Minimum standard of performance			
The eligibility condition for the exam presentation: the presence at min. 80% from all work sessions and timely delivery of the works (the project). Note on the written exam: min. 5 (five). When establishing the final grade, the student's involvement during the semester will also be taken into account: participation in debates, scientific sessions, frequency, etc.			

Date of filling in: 01.10.2019		Title Surname Name	Signature
	Lecturer	Prof. dr. ing. Gavril Kollo	
	Teachers in charge of application	Prof. dr. ing. Gavril Kollo	

Date of approval in the department	Head of department Associate Prof. PhD. eng Gavril Hoda

Date of approval in the faculty	Dean Associate Prof. PhD. eng. Nicolae Chira
