

## 8.10 CE0824 – Railway Engineering

### (1) GENERAL

<b>SCHOOL</b>	ENGINEERING SCHOOL		
<b>ACADEMIC UNIT</b>	CIVIL ENGINEERING DEPARTMENT		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	CE0824	<b>SEMESTER</b>	8
<b>COURSE TITLE</b>	Railway Engineering		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>		<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>
		3	4
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Special Background Course		
<b>PREREQUISITE COURSES:</b>	-		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes, for interested students		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.uniwa.gr/courses/CIV195/">https://eclass.uniwa.gr/courses/CIV195/</a>		

### (2) LEARNING OUTCOMES

<b>Learning outcomes</b> <i>The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.</i> <i>Consult Appendix A</i> <ul style="list-style-type: none"> <li>• Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</li> <li>• Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</li> <li>• Guidelines for writing Learning Outcomes</li> </ul>
<p>The aim of the course is to familiarize students with rail transport systems in terms of development, integration within an intermodal transport system, planning and design. Upon successful completion of the course, the students will be able to understand basic concepts and approaches for the planning and design of a railway system. More specifically, they will be able to:</p> <ul style="list-style-type: none"> <li>• Understand forces acting on railway vehicles and infrastructure;</li> <li>• Understand railway planning and perform basic estimations;</li> <li>• Explain the superstructure and substructure components and its characteristics;</li> <li>• Analyze the design parameters and calculate the components of the railway track;</li> <li>• participate in user groups in order to investigate the feasibility for the development of railway infrastructures;</li> </ul>

- Obtain sufficient knowledge that can be used in their further specialization in the subject matter of the course (e.g. in MSc studies).

### General Competences

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?;*

*Search for, analysis and synthesis of data and information, with the use of the necessary technology  
Adapting to new situations  
Decision-making  
Working independently  
Team work  
Working in an international environment  
Working in an interdisciplinary environment  
Production of new research ideas*

*Project planning and management  
Respect for difference and multiculturalism  
Respect for the natural environment  
Showing social, professional and ethical responsibility and sensitivity to gender issues  
Criticism and self-criticism  
Production of free, creative and inductive thinking  
.....  
Others...*

The course aims at the following general competences:

- Search, analysis and synthesis of data and information, using the necessary technologies
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Working in an international environment
- Project planning and management

### (3) SYLLABUS

The course contains only theoretical part with the following objectives:

- The railway as a transport system
- Historical development of railway systems
- Railway system planning
- Train traction systems
- State-of-the-art railway echnologies
- Wheel - rail interaction, loads on the rail
- Introduction to railway infrastructure
- Railway superstructure
- Railway substructure
- Train Resistance - Track loading and applied forces
- Track geometry
- Maintenance and operation of the railway system
- Railway's role in smart cities
- Driverless trains

### (4) TEACHING and LEARNING METHODS - EVALUATION

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face-to-face										
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	Communication with the students through email, the website of the course (Open eClass) and Microsoft TEAMS platform for sharing documetns. Additional support by providing exercises and examples in the Eclass.										
<b>TEACHING METHODS</b> <i>The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i>	<table> <tr> <th>Activity</th><th>Semester workload</th></tr> <tr> <td>Lectures</td><td>45</td></tr> <tr> <td>Classwork</td><td>30</td></tr> <tr> <td>Project</td><td>30</td></tr> <tr> <td>Presentation</td><td>5</td></tr> </table>	Activity	Semester workload	Lectures	45	Classwork	30	Project	30	Presentation	5
Activity	Semester workload										
Lectures	45										
Classwork	30										
Project	30										
Presentation	5										

<p><i>The student's study hours for each learning activity are given as well as the hours of non- directed study according to the principles of the ECTS</i></p>		
	Course total	110
<p><b>STUDENT PERFORMANCE EVALUATION</b></p> <p><i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open- ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>The evaluation of the students is based on:</p> <ul style="list-style-type: none"> <li>• Project work</li> <li>• Presentation of project</li> <li>• Written exams</li> </ul> <p>Students final grade results from:</p> <ul style="list-style-type: none"> <li>• Participation and delivery of project (20%)</li> <li>• Presentation of the project (10%)</li> <li>• Final written examination (70%)</li> </ul> <p>The project topics are presented to students in the 3rd week of the running semester. Relevant questions and discussion take place during office hours as well at the end of the course in weeks 9, 10 and 11. The project essay is delivered and presented in weeks 12 and 13, respectively.</p>	

## (5) ATTACHED BIBLIOGRAPHY

### Greek Bibliography:

1. Giannakos, K. (2002). Railway track loading, Papazisi ed., Athens.
2. Limperis K. (2009). Railway theory and applications", Part I and II, Symmetria.
3. Pirgidis, C. (2015). Railway Transportation Systems: Design, Construction and Operation, Ziti ed., Thessaloniki.

### Foreign Bibliography:

1. Esveld, C. (2016) Modern Railway Track, MRT-Productions, 4th Edition.
2. Pachl, J. (2018). Railway Operation and Control, 4th edition, VTD publishing.
3. Sameni, M.K. (2012). Railway Track Capacity: Measuring and Managing, University of Southampton, United Kingdom. [http://orbit.dtu.dk/files/52586686/Railway\\_Track\\_Capacity\\_Final\\_Thesis.pdf](http://orbit.dtu.dk/files/52586686/Railway_Track_Capacity_Final_Thesis.pdf)
4. Chandra, S., Agarwal, M.M. (2013). Railway Engineering, 2<sup>nd</sup> Edition, Oxford University Press.
5. Profillidis, V.A., (2014). Railway Management and Engineering, 4th Edition, Ashgate-Publishing Group, Aldershot Brookfield USA, Hong Kong, Singapore, Sydney.

### Related academic journals:

1. Transportation Research Record
2. International Journal of Transportation Science and Technology
3. Journal of International Transportation
4. International Journal of Railway Technology
5. Railway Engineering Science
6. Journal of Advanced Transportation
7. Transportation Research: Parts A: Policy and Practice
8. Transportation Research: Parts B: Methodological
9. Transportation Research: Parts C: Emerging Technologies
10. Transportation Research: Parts D: Transport and Environment
11. Transportation Research: Parts E: Logistics and Transportation Review
12. Transportation Research: Parts F: Traffic Psychology and Behaviour
13. International Journal of Sustainable Transportation
14. Transportation Planning and Technology
15. Transport Reviews
16. Transportation Journal
17. Journal of Transport and Land Use