

1.1.1 Design and Operation of Railway Transport Systems

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΣΥΓ016	SEMESTER	9th
COURSE TITLE	Design and Operation of Railway Transport Systems		
INDEPENDENT TEACHING ACTIVITIES <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>	WEEKLY TEACHING HOURS	CREDITS	
	4	5	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Specialization Course		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No		
COURSE WEBSITE (URL)			

LEARNING OUTCOMES

<p>Learning outcomes</p> <p><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></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i>
<p>Upon completing the course students should be able to collect data to design a railway transport system as well to define the level of service and safety provided and record the needs of an existing one</p> <ul style="list-style-type: none"> • To combine the previous data in order to define the parameters for the design or improvement of a railway transport system • To implement the knowledge and data in order to calculate and design a new railway transport system and its components, to monitor, predict and manage the demand of an existing one • To analyze components and operations that compose a railway transport system, clarify and classify them in terms of cost, quality and functional criteria.
<p>General Competences</p> <p><i>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?</i></p> <p><i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i> <i>Project planning and management</i> <i>Respect for difference and multiculturalism</i></p>

<i>Adapting to new situations</i> <i>Decision-making</i> <i>Working independently</i> <i>Team work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i>	<i>Respect for the natural environment</i> <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i> <i>Criticism and self-criticism</i> <i>Production of free, creative and inductive thinking</i> <i>Others...</i>
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The course contributes to the following skills:
 _Search for, analysis and synthesis of data and information, with the use of the necessary technology
 _Adapting to new situations
 _Decision-making
 _Project planning and management
 _Respect for the natural environment.

SYLLABUS

- Railway and its capabilities, the railway transport system and its historical evolution
- Power vehicles, diesel and electric traction,
 - Wheel rail interaction
 - Railway track elements
 - Railway track infrastructure
 - Railway track design
 - Railway technical projects, railway tunnels, railway bridges, embankments, trenches, drainage, noise barriers and fences
 - Railway facilities, traffic signaling, railway electrification system, railway level crossings, railway lines, switches and crossings
 - Rolling stock, design, construction and operation of rolling stock, derailment of railway vehicles
 - High-speed trains, tilting trains, urban and suburban railway systems, rack railway
 - Elements of technical railway operators, train traffic management and traffic capacity
 - Elements of commercial rail operators, railway stations, organization and management of passenger and freight rail transport, mixed train traffic control and the effects in the design and operation of railway transport systems
 - Railway safety, European policy in rail transport, interoperability technical specifications.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face to face.	
<i>Face-to-face, Distance learning, etc.</i>		
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Powerpoint presentations, e-learning platform for educational material	
<i>Use of ICT in teaching, laboratory education, communication with students</i>		
TEACHING METHODS	Activity	Semester workload
<i>The manner and methods of teaching are described in detail.</i> <i>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> <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>	Lectures	52
	Individual study	78
		Course total (26 hours workload per ECTS credit)

<p>STUDENT PERFORMANCE EVALUATION</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>Final written exam (100%) which includes:</p> <ul style="list-style-type: none"> - Open ended questions - Problem solving questions (exercises) <p>The evaluation criteria are presented in the 1st lecture of the semester to all students. Furthermore, each student can see his graded exam/ written assignment paper and talk on the analysis of his written performance with the professor.</p>
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ATTACHED BIBLIOGRAPHY

- Giannakos, K.S. (2002). Actions on the Railway. Papazisis Editions, ISBN: 978-960-02-1566-3 [in Greek].
- Limperis, K. (2011). Railway Theory and Applications. Simmetria Editions, ISBN: 978-960-266-332-5 [in Greek].
- Matsoukis E-G (2008). Transportations Design and the Railway Science Elements. Simmetria Editions, ISBN 978-960-266-230-4 [in Greek].
- Profillidis, V. (2016). The Railway Science. Giahoudis Editions, ISBN 978-618-5092-22- 1 [in Greek].
- Pirgidis, Ch. (2009). Railway Transport Systems. Ziti Pelagia Editions, ISBN: 978-960-456-155-1 [in Greek].
- Marks-Fahrman, U., Restetzki, K., Biehounek, A., Hegger, A. (2018). Railway Technology. Ion Editions, ISBN: 978-960-508-279-6 [in Greek].