

COURSE CATALOG

Course Code: CE 456				Course Name: Railway Track Engineering			
Semester	T + P + L	Credits	ECTS	Language of Instruction	Course Type	Instruction Methods	Prerequisite(s)
6-7-8	3 + 0+ 0	3	6	English	Departmental Elective (D2)	Lecture	-
Course Objectives			Turkish railways and their tracks. Rail joints, sleepers, rail to sleeper fastenings, railway curves. Switches and crossings. Ballast and subgrade, welding of rails, long welded rails. Track maintenance systems, track renewal, track tolerances, track inspection and track recordings. High speed track, track stresses, track standards and track rehabilitation. Special types of tracks.				
Topics Covered			Railway track engineering. Conventional rail making. Modern steel making process. Functions of a rail. Standard rail section. Rail joints. Problems of the rail joint. Suspended or supported joints. Sleeper density and sleeper spacing. Rail to sleeper fastening. Railway curves. Degree and radius of curves. Transition curves. Switches and crossings. Inspection and maintenance of switches and crossings. Ballast and formation. Ballast profiles, sections and depth of cushion. Welding of rails. Long welded rails. Conventional – manual track maintenance practices. Directed maintenance of track: track management system. Track renewal.				
Learning Outcomes of the Course			<p>After completing this course students should gain:</p> <ul style="list-style-type: none"> 1- describe factors influencing the geometric design of modern roads and railways [1,2,3,4,5,6] 2 - explain mechanisms and factors influencing the security of a modern railway track against buckling (heat distortion) for a straight track as well as in a curve [5,6,10] 3 - describe the emergence of forces on different components in a railway and make the necessary calculations [4,8,11] <p><i>[Note that the numbers in between the brackets address the bullet numbers in the program outcomes list.]</i></p>				
ISCED Category of the Course			52 Engineering				
Textbook			J. Mundrey, Railway Track Engineering, Tata McGraw Hill				
Recommended Sources			<ul style="list-style-type: none"> 1- Bernard Kempinski, Mid-Size Track Plans for Realistic Layouts (Model Railroader), Kalmbach Publishing Company. 2- B. Berksoy, Toplu Taşıma Sistemlerinde Demiryolu Üstyapı İnşaatı, 1994. 3- G. Evren, Demiryolu, Birsen Yayınevi, 2002. 4- C.Esveld, Modern Railway Track, Second Edition, MRT Productions, The Netherlands, 2001. 5- V.A. Profillidis, Railway Management and Engineering, Ashgate Publishing Ltd., 2006. 				

WEEKLY SCHEDULE

Week	Theoretical Topic	Applied / Laboratory Topics
1	Railway track engineering. Conventional rail making.	
2	Modern steel making process.	
3	Functions of a rail. Standard rail section.	
4	Rail joints. Problems of the rail joint.	
5	Suspended or supported joints.	
6	Sleeper density and sleeper spacing.	
7	Rail to sleeper fastening. Railway curves.	
8	Degree and radius of curves.	
9	Transition curves.	
10	Switches and crossings. Inspection and maintenance of switches and crossings.	
11	Ballast and formation. Ballast profiles, sections and depth of cushion.	
12	Welding of rails. Long welded rails.	
13	Conventional – manual track maintenance practices.	
14	Directed maintenance of track: track management system. Track renewal.	

COURSE ASSESSMENT POLICY

Activities	Number	Contribution (%)
------------	--------	------------------

Studies throughout the term	Quiz	-	-
	Term Homework/ Project	1	10
	Reports	-	-
	Graduation Thesis/ Project	-	-
	Seminar	-	-
	Homework	5	10
	Presentations	-	-
	Midterm Exams	2	35
	Project	-	-
	Laboratory	-	-
	Other (field work)	14	05
FINAL EXAM	1	40	
Total		100	

CONTRIBUTION OF THE COURSE TO CIVIL ENGINEERING PROGRAM OUTCOMES

	Program Outcomes	1	2	3
1	The ability to apply knowledge of mathematics, science, and engineering		X	
2	The ability to identify, formulate, and solve engineering problems			X
3	The ability to design a system or component to meet desired needs with realistic constraints such as economic, environmental, social, ethical, health and safety, manufacturability and sustainability			X
4	The ability to analyze and interpret data			X
5	The ability to design and conduct experiments and apply experimental results to improve processes			X
6	The ability to convey technical material through oral presentations and written papers/reports		X	
7	The ability to function within multidisciplinary teams		X	
8	The understanding of professional and ethical responsibilities		X	
9	The understanding of the impact of engineering on society		X	
10	The understanding of the necessity to engage in life-long learning		X	
11	The understanding of management and leadership principles and techniques	X		
12	The appreciation of the role of research in civil engineering problems	X		
13	A knowledge of contemporary issues in civil engineering		X	
14	The ability to use modern engineering techniques, skills, and tools		X	
15	The ability to understand and explain basic concepts in management, business, and leadership		X	
16	A commitment to quality, punctuality and continuous improvement			X

Contribution Level: 1 low, 2 medium, 3 high

ECTS-WORKLOAD TABLE

ACTIVITIES	Number	Duration (Hour)	Workload(Hour)
Lecture Time	14	3	42
Final Exam (Including Preparation Time)	1	16	16
Quiz	-	-	-
Term Homework / Project	1	10	10
Reports	-	-	-
Graduation Thesis/Project	-	-	-
Seminar	-	-	-
Study Time Outside the Class	14	3	42
Homework	5	4	20
Presentations	-	-	-
Midterm Exams (Including Preparation Time)	2	10	20
Project	-	-	-
Laboratory	-	-	-
Total Workload			150
ECTS Credits of the Course (Total Workload / 25)			6

Last update on 19.01.2014	Coordinator / PREPARED BY Esin İnan	APPROVED BY Esin İnan
------------------------------	--	--------------------------