

FORM 1: INTRODUCTION AND EVALUATION

Code: INS3442		Course Name: Railway Engineering						
Year	Semester	Group(s)	Language	Theory	Appl.	Lab.	Credit	ECTS
	6/Spring	1-5	Turkish/English	2	2	0	3	5
Course Type		Basic Sciences ☐	Engineering ☒	Technical Elective ☐		Non-Technical Elective ☐		
Prerequisite		-						
Coordinator		Professor Dr. İsmail ŞAHİN						
Instructor(s)		İsmail ŞAHİN, Mustafa GÜRSOY, Halit ÖZEN, Mustafa Sinan YARDIM, Güzin AKYILDIZ ALCURA						
Course Goals		Teaching geometrical and physical design principles of railway lines.						
Course Topics		Introduction to transportation engineering; Basic features of transportation systems / Features of railway transportation / Types and features of rolling stocks / Rolling motion and generalized equation of motion / Propulsion resistances / Stages of train movements: acceleration, cruising and deceleration / Slopes and its types / Determination of curve radius / Superelevation and transition curve / Cross sections of single and double tracks and clearances / Demand based passenger and freight train supply / Properties and performance measures of railway track / Track elements: Rail, ties, fastening equipment and ballast / Track design / Location survey and grade line / Plan, profile, cross section. Earthwork: cut and fill / Soil classification and its features / Swell and compaction / Cross section calculations / Volume calculations / Properties of mass diagrams / Balance lines. Costs of earthwork.						
Knowledge and Skills		Learning the scope of transportation engineering and awareness about sustainable practices; Understanding basic concepts of route alignment and perform earth work calculations; Modeling the motion of rail vehicles; Learning design features of horizontal and vertical alignment elements of rail lines; Design of railway track elements						
References		1) Instructing the course online (presentations are recorded for distance access). 2) Toprak İşleri ve Demiryolu, İnal Seçkin, Çağlayan Kitabevi, 2003. 3) Demiryolu, Güngör Evren, Birsen Yayınevi, 2002. 4) Karayolu Mühendisliği, Nadir Yayla, Birsen Yayınevi, 2002. 5) Karayolu Projesi Temel Bilgileri, Tuğba Kiper, YTMK, 2002. 6) W.W. Hay, Railroad Engineering, John Wiley & Sons.						
Assignments and Projects		1) Earth works (takes approx. five weeks to complete) 2) Railways (takes approx. five weeks to complete)						
Laboratory Experiment topics		-						
Computer usage		-						
Other Activities		-						
SUCCESS EVALUATION								
Theoretical Courses			Projects					
	Number	Weight (%)		Number	Weight (%)			
Midterm(s)	1	42 (=0,70*60)	Midterm(s)					
Quizze(s)	-		Controls					
Assignment(s)	2	18 (=2*0,15*60)	Mid-Submission(s)					
Laboratory	-		Oral Exam					
Other	-		Other					
Final Exam	1	40	Final Exam					

FORM 2: COURSE SCHEDULE

Code: INS3442	Course Name: Railway Engineering
Instructor(s)	İsmail ŞAHİN, Mustafa GÜRSOY, Halit ÖZEN, Mustafa Sinan YARDIM, Güzin AKYILDIZ ALÇURA
Week 1	Getting acquainted, course introduction, resources, and evaluation; Introduction to transportation/railway engineering Introduction to railway transportation. Types and features of rolling stocks
Week 2	Rolling motion and generalized equation of motion Propulsion resistances; Diagram of traction and resistance forces
Week 3	Stages of train movements: acceleration, cruising, and deceleration; Some calculations under given conditions Slopes and its types
Week 4	Determination of curve radius; theoretical and practical superelevation Types of superelevation, applying superelevation, some calculations under given conditions; Demand-based passenger and freight train supply
Week 5	Introducing and explaining the 1st Assignment <i>In-class numerical example solutions</i> (Geometric properties of railway lines, vehicle motion, resistances, traction, superelevation and transition curve)
Week 6	Transition curves, Cross sections of single and double tracks and clearances; Track elements: Rail, ties, fastening equipment and ballast Properties and performance measures of railway track, dynamic impact coefficient
Week 7	Stresses on track elements; Calculating and examining stresses on rail, ties, ballast, and soil <i>In-class numerical example solutions</i> (Railway track and other topics)
Week 8	LECTURING / FREELANCE WORK HOLIDAY
Week 9	MID-TERM EXAMINATIONS WEEK
Week 10	Topographical maps, location survey and zero polygon study, elements of alignment route, route axis; Plan, profile, definition of transition zone, and cross section drawings Elements of cross sections, slopes, soil classification and their properties, swell and compaction
Week 11	Cross section calculations and numerical examples; earthwork volumes and volume calculations of earthwork quantities Numerical examples of volume calculations, table of earthwork quantities (introduction with an example)
Week 12	Introducing and explaining the 2nd Assignment <i>In-class numerical example solutions</i> (Route alignment, swell and compaction of soil, cross section calculations, volume calculations, table of earthwork quantities)
Week 13	Mass diagram for earthwork quantities and its properties; cost equations of machinery, Excavation and Haul Distance-Cost (KTU-M) Diagram First-Degree and Second-Degree balance of mass diagram, and cost calculations
Week 14	Numerical examples for mass diagram balancing and Bruckner Method <i>In-class numerical example solutions</i> (Mass diagram and its balance, earth work cost calculations) – EXCUSE EXAMINATION