

IM 456 HIGHWAY MATERIALS		CIVIL ENGINEERING	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
7	3	0	0
Language	English		
Compulsory / Elective	Elective		
Prerequisites	No		
Catalog Description	Nature, sources and uses of asphalts. Chemistry of asphalt. Physical properties of asphalts. Tests on asphalts. Classification and properties of aggregates. Tests on aggregates. Aggregate calculations. Types of asphalt-aggregate combinations and their applications. Significant properties of asphalt paving mixture calculation. Asphalt mix design.		
Course Objectives	Introduction to the design methods applicable to flexible pavement materials, provision of skills and theoretical knowledge required for flexible pavement design, and introduction of experimental methods applied on flexible pavement materials.		
Course Outcomes	Acquisition of skills required for flexible pavement design, gaining familiarity with the asphalt and mineral aggregate laboratory tests and skill required for conducting these tests.		
Textbook and /or References	1.A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials, Washington DC, 2000. 2.Tunç, A., Yol malzemeleri ve Uygulamaları, Atlas Yayın Dağıtım, İstanbul, 2001. 3.Önal, M.A. ve Kahramangil, M., Bitümlü Karışımlar Laboratuvar El Kitabı, Karayolları Genel Müdürlüğü Yayınları, Ankara, 1993. 4.Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types. Asphalt Institute Manual Series No. 2 (MS-2) 1984; Çevirenler, Önal, M.A. ve Karaca, S., Karayolları Genel Müdürlüğü Yayınları, Ankara, 1990.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	34
	Quizzes	-	-
	Homeworks	6	6
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	8	10
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	30	
	Engineering Science	50	
	Engineering Design	20	
	Social Sciences	0	
Instructors	Yrd. Doç. Dr. M. Kürşat ÇUBUK		

COURSE PLAN	
Week	Topics
1	General information on pavements
2	Physical and chemical properties of asphalts and other binding materials.
3	Tests applied on asphalts and other bituminous materials
4	Performing asphalt penetration test and determination of unit weight of bitumen
5	Performing Ring and Ball softening point test and ductility test
6	Performing Heat Loss and Cleveland Flash and Burning point tests
7	Introduction to mineral aggregates and classification of aggregates.
8	Midterm Exam I
9	Tests applied on aggregates and relevant laboratory work.
10	Criteria used in mix-design and mix-design methods
11	Applications of mix-design criteria
12	Demonstration of experimental methods of mix-design
13	Midterm Exam II
14	General Revision.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM				
	Program Outcomes	1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering	X		
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs	X		
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems	X		
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	X		
Contribution of the course : 1:None 2:Partially 3:Completely				