

Department of Civil Engineering			
Transportation Systems Eng'g I (61360)			
Total Credits		3	
major compulsory			
Prerequisites		P1 : Soil Mechanics (61302) OR Soil Mechanics (61331) P2 : Surveying II (61322) OR Surveying II (61221) P11Synch. : Soil Mechanics (61331) OR Soil Mechanics (61302)	
Course Contents			
Introduction to Transportation Systems Engineering, Human, Vehicle and Transportation Environment Characteristics, Highway Location, Geometric Design of Highway Facilities, Soil Engineering for Highway Design, Asphalt Pavement Surfaces, Pavement Design, Pavement Management			
Intended Learning Outcomes (ILO's)		Student Outcomes (SO's)	Contribution
1	1. an ability to apply knowledge of mathematics, science, and engineering in the human, vehicle and transportation environment characteristics, highway geometrics, and highway pavements.	A	20 %
2	1. an ability to design and conduct pavement experiments and highway location and geometric studies, as well as to analyze and interpret related data	B	15 %
3	1. an ability to design a highway and pavement systems and their components (route selection, horizontal and vertical alignment and cross section design, as well as pavement layered systems and pavement mixes) to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, safety, and sustainability .	C	35 %
4	1. an ability to identify, formulate, and solve highway location and geometrics and pavement engineering problems, and understand contemporary issues in highway engineering	E	30 %
Textbook and/ or References			
1. Traffic and Highway Engineering, 4th edition. By: N. Garber, CI-Engineering Publisher, 2010. 2. Principles of Highway Engineering and Traffic Analysis. 4th edition. By: F. Mannering, 2008. 3. A Policy on Geometric Design of Highways and Streets. By: AASHTO, 2011. 4. Transportation Engineering An Introduction. 2nd ed., Prentice-Hall Inc., New Jersey. By C. Khisty and B. Lall, 1998. 5. Transportation Engineering, McGraw-Hill, New York. By: J. Banks, 1998. 6. Highway Engineering, 6th edition. By: P. Wright, 1996. 7. AASHTO Guide for Design of Pavement Structures, 1993. 8. Fundamentals of Transportation Engineering. By: C. Papacostas, 1987. 9. H. Atkins. Highway Materials, Soils and Concrete. 4th edition, 2002. 10. Highway Engineering, 4th edition. By: C. Oglesby and R. Hicks, 1982.			
Assessment Criteria		Percent (%)	
First Exam		20 %	
Second Exam		20 %	
Homeworks		10 %	
Final Exam		50 %	
Course Plan			
Week	Topic		

1	1. Introduction to Transportation Systems Engineering 1.1 Introduction to the transportation sector 1.2 Transportation systems characteristics 1.3 Modes of transportation 1.4 Transportation systems issues and challenges
2, 3 &4	2. Human, Vehicle and Transportation Environment Characteristics 2.1 Human-vehicle-environment interaction 2.2 Driver characteristics 2.3 Vehicle characteristics 2.4 Road-vehicle performance
5	3. Highway Location 3.1 The highway design process 3.2 Design controls and criteria 3.3 Highway location
6, 7 &8	4. Geometric Design of Highway Facilities 4.1 Design of the cross section 4.2 Design of the horizontal alignment 4.3 Design of the vertical alignment 4.4 Design of Parking Facilities
9	5. Soil Engineering for Highway Design 5.1 Soil characteristics and classification 5.2 Soil investigations 5.3 Soil compaction 5.4 California Bearing Ratio CBR
10 &11	6. Asphalt Pavement Surfaces 6.1 Bituminous materials 6.2 Asphalt concrete properties 6.3 HMA Marshall mix design method 6.4 Asphalt production and quality control
12, 13 &14	7. Pavement Design 7.1 Equivalent Axle Loads 7.2 AASHTO method 7.3 Introduction to Mechanistic-Empirical Pavement Design 7.4 Rigid pavement design and types of joints
15	8. Pavement Management 8.1 Highway rehabilitation 8.2 Pavement condition survey 8.3 Types of pavement distresses-causes and repair