

Department of Civil Engineering				
Course Name: Transportation Systems I (10601360)				
Total Credits: 3		Contact Credits: 3 Theoretical Hours per Week		
Type of Course: Major compulsory		Categorization of Credit: Engineering Topic		
Prerequisites		Surveying II (10601320) Soil Mechanics (10601330) (Or Concurrent)		
Course Description				
Students will learn the basics of transportation systems engineering, and the human, vehicle and transportation environment characteristics, with concentration on the road system. This includes study of highway location and geometric design of highway facilities, as well as pavement engineering, including soil engineering for highway design, bituminous materials, asphalt mix design, flexible pavement design, rigid pavement design, and pavement management.				
Course Learning Outcomes (CLO's)		Student Outcomes (SO's)	Performance Indicators (PI's)	Contribution %
i	an ability to understand the basics of transportation systems engineering with concentration on the road system	1	1.1	10%
ii	an ability to identify and formulate the complex transportation systems engineering problems, whether related to the characteristics of the human, vehicle, transportation environment, or the interaction among them	1	1.2	15%
iii	an ability to identify design concepts, requirements and specifications, and apply established design methodologies to achieve targeted road geometric and pavement design	2	2.1	20%
iv	an ability to produce engineering design alternatives to find proper solutions to the road location and geometric design components, as well as pavement layered systems and pavement mixes, that meet specified needs with consideration of safety and welfare, as well as global, cultural, social, environmental, and economic factors	2	2.2	55%
Textbook and/ or References				
1. Traffic and Highway Engineering, 5 th edition (SI edition). By: N. Garber, and L. Hoel, CI-Engineering Publisher, 2015. 2. Principles of Highway Engineering and Traffic Analysis, 7 th edition (SI edition). By: F. Mannering, and S. Washburn, John Wiley & Sons, 2019. 3. A Policy on Geometric Design of Highways and Streets. 7 th ed., By: AASHTO, 2018. 4. Transportation Engineering – An Introduction. 3 rd ed., By C. Khisty and B. Lall, Prentice-Hall Inc., New Jersey, 2003. 5. Transportation Engineering, 7 th edition. By: J. Banks, McGraw-Hill, New York, 2001. 6. Highway Engineering, 7 th edition, By: P. Wright & K. Dixon, John Wiley & Sons, 2004. 7. AASHTO Guide for Design of Pavement Structures, AASHTO, 1997. 8. Fundamentals of Transportation Engineering. By: C. Papacostas, Prentice Hall, 1987.				

Assessment Criteria	Percent (%)
Midterm Exam	30%
HW/Quizzes/Others/Forums	20%
Final Exam	50%

Course Plan	
Week	Topic
1	1 Introduction to Transportation Systems Engineering
2	2.1 Human-vehicle-environment interaction 2.2 Driver characteristics
3	2.3 Vehicle characteristics
4	2.4 Road-vehicle performance
5	3.1 The highway design process 3.2 Design controls and criteria 3.3 Highway location
6	4.1 Design of highway cross sections
7	4.2 Design of the horizontal alignment
8	4.3 Design of the vertical alignment
9	4.4 Design of special facilities
10	5.1 Soil characteristics and classification 5.2 Soil investigations 5.3 Soil compaction 5.4 California Bearing Ratio – CBR
11	6.1 Bituminous materials 6.2 Asphalt concrete properties
12	6.3 HMA Marshall mix design method 6.4 Asphalt production and quality control
13	7.1 Equivalent axle loads 7.2 Flexible pavement design
14	7.3 Rigid pavement design
15	8.1 Highway rehabilitation 8.2 Pavement condition survey 8.3 Types of pavement distresses-causes and repair
16	Final Exam