King Saud University
College of Engineering
Civil Engineering Department

Transportation Systems (CE 430)

Course Description CE430 Transportation Systems (Required for a B.Sc.E degree)	The course introduces civil engineering students to transportation systems and modes, vehicle operations, human factors involved in roadway design, traffic flow models, capacity analysis, level of services analysis, and transportation planning process [2(2,1,0)].
Prerequisite	STAT 324 - Engineering Probability and Statistics
Course learning objectives	Upon successful completion, the student will be able to: 1. Understanding basic transportation systems components and concepts. 2. Understanding how vehicle and driver characteristics influence the design of various transportation systems. 3. Understanding of traffic flow characteristics and interrelations, including capacity, speed and safety considerations, and relate it to the design of transportation links and nodes. 4. Learning basic procedures for highway capacity and level of service analysis. 5. Basic understanding of travel demand and traffic forecasting.

	Topic	Weeks	Hours
Topics covered	The transportation system, its classification & models.	1	2
	Transportation modes.	1	2
	Equations of motion and human factors.	2	4
	Traffic stream flow models.	4	8
	Capacity and level of service analysis.	4	8
	Transportation planning process.	1	2
	Travel demand forecasting models.	2	4

Class/tutorial schedule	Class: one time 100-minute lecture or two times 50-minute lectures per week. Tutorial: one time per week in 50-minutes sessions
Computer applications	None
Project	None
Contribution of course to meeting the professional component	1. Students learn the analysis process of transportation systems. 2. Students recognize the role of professional societies in developing codes and standards as well as updating current knowledge.
Relationship of Course to Program Outcomes	1. An ability to apply knowledge of mathematics, science and engineering. 2. An ability to identify, formulate and solve engineering problems. This includes the ability to evaluate and synthesize information and develop alternative solutions. 3. The broad education necessary to understand the impact of engineering solutions in global, economic, environmental and societal context.
Textbook(s) and/or other required material	1. Papacostas, C. S. and P. D. Prevedouros, Transportation Engineering and Planning, Third Edition, Prentice Hall, 2009. 2. Handouts
Prepared by	Dr. Seongkwan M. Lee Dr. Walied A. Elsaigh Dr. Hamad A. Alsoliman

Grade Distribution

Description	Percentage	Dates and Times
Quizzes	16	Weekly quizzes and bi-weekly assignments
1st Mid-term	22	**Thursday**/ 19 – March / 4:00 – 5:30
2nd Mid-term	22	**Thursday**/ 16 – April / 4:00 – 5:30
Final Exam	40	To be determined by faculty registrar

*Attendance is crucial and shall be made on time

Textbook topics and relevant sections:

Chapter	Topics	Homework	Week #
1	Background, The Transportation System, Transportation System Classification, Tools and Applications. Sections: 1.1, 1.2, 1.4		1st
2	Equations of Motion, Human Factors. Sections: 2.1, 2.2, 2.3	1, 2, 3, 5, 6, 7, 8, 10, 11, 12	3rd and 4th
3	Vehicular Stream Models, Stream Variables, Vehicular Stream Equations and Diagrams. Sections: 3.1 ,3.2, 3.3, 3.4	1, 3, 4, 5, 7, 8, 9, 11	5th
4	Pedestrian Flow Models, Pedestrian Level of Service, Uninterrupted Flow of Transit Systems, Uninterrupted and Interrupted Flow of Highways. Section: 4.1, 4.3.1, 4.3.2, 4.3.3, 4.5.1, 4.5.2, 4.5.3, 4.5.4, 4.6.1, 4.6.2, 4.6.3 (until page 162), 4.6.4, 4.6.5, 4.6.6	2, 3, 4, 6, 10, 11(b), 14, 15,16, 20, 21, 22, 24, 25, 26, 27	6th, 7th, 8th, and 9th
5	Transportation Modes, Intercity Passenger Travel. Sections: 5.1, 5.2, 5.3, 5.4	1, 2, 6, 9, 11	2nd
7	Introduction to Transportation Planning, Housing Policies, Planning Studies and Methods, Travel-Demand Forecasts, Transportation and Land Use. Sections: 7.1, 7.2.5, 7.3.1, 7.4 (only the background), 7.4.3, 7.4.4, 7.4.5, 7.5.1, 7.5.2	4, 8, 10, 11,14, 16, 17, 20, 25	11th
8	Introduction to Travel Demand Forecasting, Trip Generation, models, Trip Distribution Models, (gravity model), Mode Choice (Logit Model), Introduction on Trip Assignment Models. Sections: 8.1, 8.2.1, 8.2.2, 8.2.3, 8.2.4, 8.2.5, 8.2.6, 8.2.7, 8.3.1, 8.3.2, 8.3.3, 8.3.4, 8.4.1, 8.4.2, 8.4.3, 8.5.1, 8.5.2, 8.5.4, 8.5.6, 8.5.8, 8.5.9, 8.5.10	1, 2, 3, 4, 6, 8, 9,14, 19,20, 22	12th, 13th, 14th, and 15th
13	Experimental Data and Model Parameters, Simple Linear Regression, Multiple Linear Regression, Direct Nonlinear Regression, Selection of Explanatory Variables. Sections: 13.3, 13.4.1, 13.4.2, 13.4.3, 13.4.4, 13.4.6	23, 24	10th