CE 471 — Principles of Transportation Engineering 3 Units

USC | SONNY ASTANI DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

ABET Course Syllabus

Course Information, Textbook and Supplementary Materials

Course Description: Planning, design, construction, maintenance, and operation of facilities for air, water, rail, and highway transit systems. Junior or senior standing.

Required for: BSCE
Elective for: BSCE Building Science

Prerequisite: As required by the department
Co-requisite: None

Required Textbook: C. S. Papacostas and P. D. Prevedouros, "Transportation Engineering and Planning", Third Edition, Prentice Hall, 2001.

Reference: None

Topics Covered	Learning Outcomes
Equations of motion, Human Factors, Geometric Design	Review of basic laws of motion and their applications to compute braking distance, radius of curvature, etc. Considerations for human reaction delay in determining minimum yellow time at traffic intersections. Design of horizontal and vertical curves.
Traffic Flow Theory	Relationship between car following model and traffic flow equations. Thorough understanding of fundamental traffic diagram and shock waves in traffic. Application of shock wave to computations of queue lengths at intersections.
Capacity and Performance Analysis	Traffic signal control basics. Determination of green light times for different phases at an intersection based on inflows on different approaches and minimum pedestrian crossing times. Level of service analysis.
Travel Demand Forecasting	The key steps in demand forecasting from trip generation growth at zones, to inter-zonal trips, to distribution of those trips among different modes, to traffic flow on links. Discrete choice models.

Network representation of transportation system. User and social equilibrium. |

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Lecture and Lab Schedule

Lecture		La	
Sessions per Week	Duration per Session	Sessions per Week	Duration per Session
1	140 minutes	N/A	N/A

Contribution of Course to Meeting the Professional Component (Criterion 4)

Engineering Topics

Example: In this course, students will learn a basic knowledge of forces and moments on and between components of a structure with an emphasis on the fundamental steps (e.g., setup, analysis, solution, discussion) of engineering problems. They will also learn to analyze: forces and moments on a static rigid body, moments on/between multiple static rigid bodies and internal forces/moments in a static rigid body.

Relation of Course Objectives to Program

The Civil Engineering program is designed to teach beyond the technical content of the curriculum and prepare the students to utilize what they learn in a professional setting.

This course contributes to the program outcomes as outlined in the adjacent table.

Course Contribution to Program Outcomes (a-k)	✓ Key
e. An ability to identify, formulate and solve engineering problems	

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