IZMIR INSTITUTE OF TECHNOLOGY
CIVIL ENGINEERING DEPARTMENT

CE 523 – THEORY OF TRAFFIC FLOW
SYLLABUS
SPRING 2026

Class Meeting Time: Thursdays 13:30 – 16:15
Location: CZ-14

Instructors: Asst. Prof. Dr. Tolga ERCAN – Email: tolgaercan@iyte.edu.tr

Office Hours: By appointment only

Description: The purpose of the course is to introduce students to the field of Traffic Engineering, which covers the different components of traffic system, traffic-stream characteristics, traffic studies, and data collection. The students will have a build on ability to learn the traffic flow theory as well as shockwave theory, car following models.

Textbook:

- Traffic Flow Fundamentals by Adolf J. May, 1990
- Traffic Engineering by Roess, Prassas, and McShane. Pearson. Fourth Edition.

References: 2918 Sayili Karayollari Trafik Kanunu
Karayollari Trafik Yonetmeligi
Karayolu Trafik Isaretleme Standartlari
Highway Capacity Manual 6th and 7th Editions
Highway Safety Manual, 1st Edition, 2010, (including 2016 Errata)
Manual of Uniform Traffic Control Devices (MUTCD), 2023,
https://mutcd.fhwa.dot.gov/

Learning Outcome:

- Fundamentals of traffic flow theory and stream characteristics
- Traffic data collection and interpretation
- Shockwave theory and bottleneck analysis
- Develop the basics of signal phasing and timing plans

Grading Policy:

- Class Project – 1 (Individual Project) (**15% of GRADE)**: Analyzing Highway Capacity Manual (HCM) and finding improvements for local applications, reporting, and presenting.
- Class Project – 2 (Group Project) (**15% of GRADE)**: Traffic data collection, analysis, reporting, and presenting.
- Midterm Exam: **30% of GRADE (In Class Exam)**
- Final Exam: **40% of GRADE (In Class Exam)**

- Class Participation and Attendance: **5% BONUS on the GRADE**. 80% of class participation and attendance will provide 5% of BONUS to the final grade.

Date	**Week**	**Lecture Content**
26/2/2026	Week 1	Introduction to Class - Introduction of Traffic Engineering Concepts
5/2/2025	Week 2	Components of the Traffic System and Roadway - Traffic Stream Characteristics
12/3/2025	Week 3	Traffic Stream Characteristics - Traffic Flow Theory
19/3/2025	Week 4	**NO Class Holiday Break**
26/3/2025	Week 5	Statistical Applications – Traffic Data Collection Volume - Speed, Travel Time, and Delay Studies
2/4/2025	Week 6	Fundamentals & Concepts of Uninterrupted Flow Facilities
9/4/2025	Week 7	Shockwave Theory & Moving bottleneck and queuing & Car following model and Traffic simulation applications
16/4/2025	Week 8	**Class Project-1 Student Presentations**
23/4/2025	Week 9	**NO Class on 23rd of Apr 2026**
30/4/2025	Week 10	Shockwave Theory & Moving bottleneck and queuing & Car following model and Traffic simulation applications
7/5/2025	**Week 11**	**Midterm Exam**
14/5/2025	Week 12	**NO Class for Spring Break 14-15 May 2026**
21/5/2025	Week 13	Fundamentals of Signalized Intersection and Signal Timing Design
28/5/2025	Week 14	**NO Class Holiday Break**
4/6/2025	Week 15	Intelligent Transportation Systems - Traffic Impact Analysis
11/6/2025	Week 16	**Class Project-2 Student Group's Presentations Class Recap**
17/6/2025 – 30/6/2025	**Final Exams Week**	**TBD**