Traffic Engineering: Traffic Flow, Capacity, Intersection Design and Traffic Impact Assessment

6 – 10 June 2027
Jeddah - Corniche four-star



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Ref: 340_15651 **Date:** 6 – 10 June 2027 **Location:** Jeddah - Corniche four-star **Fees:** 19500 SAR

Introduction:

Traffic engineering decisions in municipalities are often taken on judgement alone: a new mall is approved without checking what its trips do to the next junction, a roundabout is chosen where a signalised junction would carry more queues, and roadworks close a lane at the peak hour. This Core Concept course gives authority engineers a numeric method to count and analyse traffic flow, test capacity and level of service, design and time junctions, and assess the traffic impact of new developments. Participants build a Traffic Impact Assessment and Junction Capacity Report for a development site.

Course Objectives:

- Plan and run classified turning counts, speed surveys and queue length surveys that produce design-hour volumes
- Calculate flow, speed and density relationships and identify bottlenecks on urban links and approaches
- Assess capacity, volume-to-capacity ratio and level of service for priority junctions, roundabouts and signalised junctions using HCM concepts
- Select and lay out the right junction control and prepare a fixed-time signal plan with pedestrian clearance and phase sequence
- Prepare a traffic impact assessment for a development covering trip generation, distribution, assignment, parking demand and mitigation
- Review pedestrian, cyclist, road safety and roadworks traffic management proposals submitted to the authority

Target Audience:

- Municipal engineering staff who design and approve junction layouts and road markings
- Development control engineers who review traffic studies submitted with planning applications
- Transport planning staff who prepare corridor and network traffic studies
- Traffic operations staff who maintain fixed-time signal plans and junction performance
- Consultant engineers who prepare traffic impact reports for public and private developments
- Roadworks permit staff who check temporary traffic management plans

Course Outline:

Day 1: Traffic Flow Fundamentals and Traffic Data Collection

- Flow, Space Mean Speed and Density: The Fundamental Diagram
- Peak Hour Factor, Design-Hour Volume and Passenger Car Equivalents
- Classified Turning Movement Counts: Manual Tally Sheets and Video Counts
- Spot Speed Surveys and the 85th Percentile Speed Method
- Queue Length, Delay and Origin-Destination Survey Design

Day 2: Capacity and Level of Service Using HCM Concepts

- Highway Capacity Manual Structure, Facility Types and Level of Service A to F
- Saturation Flow Rate and Lane Group Adjustment Factors
- Volume-to-Capacity Ratio and Control Delay Calculation Worksheet
- Unsignalised Priority Junction Capacity: Gap Acceptance and Critical Headway
- Urban Street and Multilane Link Level of Service Assessment

Day 3: Intersection Design, Junction Control and Fixed-Time Signal Plans

- Junction Control Selection Matrix: Priority, Roundabout or Traffic Signals
- Roundabout Geometry: Entry Deflection, Yield-at-Entry and Capacity Checks in ARCADY or SIDRA Intersection
- NEMA Phasing Diagram and Phase Sequence for Conflicting Movements
- Fixed-Time Signal Plan: Critical Lane Volumes, Green Apportionment and Intergreen Periods
- Pedestrian Walk and Flashing Clearance Timing and Green Wave Progression Between Adjacent Junctions

Day 4: Traffic Impact Assessment, Parking and Active Travel

- Traffic Impact Assessment Scoping: Study Area, Horizon Years and Assessment Scenarios
- Trip Generation Rates, Trip Distribution and Network Assignment Spreadsheet
- Parking Demand Estimation, Parking Accumulation Surveys and Access Layout
- Pedestrian Crossing, Footway Width and Cycle Lane Design Checks
- Mitigation Options Appraisal: Junction Upgrades, Access Changes and Travel Plans

Day 5: Safety, Roadworks Traffic Management and the Development Case

- Road Safety Audit Stages and High-Crash Location Review at Overview
- Temporary Traffic Management Layouts: Lane Closures, Taper Lengths and Signing Schedules
- Traffic Microsimulation at Overview: Calibration, Validation and When to Use It
- Mixed-Use Development Case: Junction Capacity Model Build with Base and Future Scenarios
- Traffic Impact Assessment and Junction Capacity Report Drafting and Peer Review

Skills You Will Gain:

- Traffic Survey Design
- Traffic Flow Analysis
- Junction Capacity Analysis
- Level of Service Assessment
- Signal Phasing Design
- Trip Generation Modelling
- Parking Demand Estimation
- Temporary Traffic Management Review

Why Attend This Course:

- Return with a Traffic Impact Assessment and Junction Capacity Report that can be used as a template for the next development application
- Challenge consultants' traffic studies by checking their counts, trip rates, capacity results and mitigation against a clear method
- Explain to planning committees and managers why a junction will fail or work, using volume-to-capacity ratio, delay and queue length
- Work through junction and development cases with engineers from municipalities, road authorities and consultancies

Conclusion:

Traffic engineering turns counts into decisions: how much a junction can carry, which control suits it, how long each green should be and what a new development will add to the network. The week moves from flow theory and surveys through capacity and level of service, junction layout and fixed-time signal plans, then into traffic impact assessment, parking and active travel, road safety, roadworks and microsimulation. On the final day participants model a development case and complete a Traffic Impact Assessment and Junction Capacity Report.