CONCEPT

Transport Planning and Travel Demand Modelling: Four-Step Models and Corridor Appraisal

29 November – 10 December 2026
Riyadh - KAFD district five-star



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Introduction:

Transport planning and travel demand modelling decisions are often made on forecasts nobody can explain: a rail line is justified with trip tables that were never validated, a bus network is redesigned without testing mode shift, and parking and pricing policies are adopted without estimating their effect on traffic. This Core Concept course gives planners and modellers a traceable method to build and calibrate a four-step model, forecast demand under future scenarios, test demand management and public transport options, and appraise multimodal corridor schemes. Participants produce a Corridor Transport Plan with Demand Forecast and Appraisal.

Course Objectives:

- Structure a transport planning study from goals, objectives and problem definition through options, evaluation and monitoring
- Specify household travel surveys, traffic and passenger counts and passive GPS or mobile data to build a model base year
- Build and calibrate trip generation, gravity model distribution, logit mode choice and highway and transit assignment in a macroscopic modelling package
- Forecast travel demand for future land use and network scenarios and test travel demand management and public transport service options
- Analyse accessibility, corridor performance and emissions for multimodal alternatives and appraise them with cost-benefit and multi-criteria methods
- Prepare a Corridor Transport Plan with demand forecast, appraisal summary and stakeholder engagement plan for decision makers

Target Audience:

- Transport planning staff who prepare strategic, regional and corridor transport plans
- Demand modelling staff who build, run and maintain macroscopic travel demand models
- Road authority staff who prioritise network investment and review forecasts behind road schemes
- Public transport authority staff who plan routes, frequencies and rapid transit investments
- Urban planning staff who test the transport effects of land use plans and growth scenarios
- Consultant planners who deliver modelling and appraisal studies for public clients

Course Outline:

Day 1: Transport Planning Process, Objectives and Study Design

- Rational Planning Model: Goals, Problem Definition, Options, Evaluation and Plan
- Pre-Analysis, Technical Analysis and Post-Analysis Phases of a Transport Study
- SMART Transport Objectives and Problem Statement Template
- Strategic, Corridor and Sub-Area Study Scales and Model Fitness for Purpose
- Study Scoping Matrix: Horizon, Modes, Trip Purposes and Time Periods

Day 2: Travel Data, Zoning Systems and Network Coding

- Household Travel Survey Design: Sampling, Trip Diaries and Expansion Weights
- Screenline Traffic Counts, Passenger Boarding Counts and Roadside Interview Surveys
- Passive GPS, Mobile Network and Smart Card Data for Origin-Destination Matrices at Overview
- Traffic Analysis Zone System Design, Centroids and Connectors
- Highway and Transit Network Coding: Link Types, Speed-Flow Curves and Line Routes

Day 3: Trip Generation and Trip Distribution

- Trip Production Regression and Cross-Classification Rates by Trip Purpose
- Trip Attraction Models and Production-Attraction Balancing
- Gravity Model Formulation with Negative Exponential Friction Factors
- Doubly Constrained Distribution and Furness Balancing Factor Iteration
- Trip Length Frequency Distribution Check Against Observed Survey Data

Day 4: Mode Choice Logit Models and Network Assignment

- Generalised Cost: In-Vehicle Time, Waiting, Walking, Fares and Value of Time
- Multinomial and Nested Logit Mode Choice Utility Functions
- Wardrop User Equilibrium Highway Assignment and Volume-Delay Functions
- Transit Assignment: Headway-Based and Timetable-Based Path Choice
- Model Runs in VISUM, EMME or Cube-Type Macroscopic Packages

Day 5: Calibration, Validation and Scenario Forecasting Case

- Calibration Targets: Mode Shares, Trip Lengths and Screenline Totals
- Validation Statistics: GEH, Percentage Root Mean Square Error and Count Comparisons
- Matrix Estimation from Counts and the Limits of Adjustment
- Future-Year Scenario Build: Land Use Inputs, Network Schemes and Growth Assumptions
- Guided Case: Base-Year Model Check and Do-Minimum Forecast Report

Day 6: Travel Demand Management Measures and Their Modelled Effects

- Parking Supply Caps, Charging and Cost Allocation to Users
- Congestion Charging and Time-Distance-Place Road Pricing Elasticities
- Flexible Work Schedules, Workplace Travel Plans and Peak Spreading
- Walking and Cycling Networks, Micromobility and Active Travel Demand Estimates
- Representing Demand Management Packages in Generalised Cost and Mode Choice

Day 7: Public Transport Service Planning and Land Use Integration

- Route Network Design: Trunk-Feeder Versus Direct-Service Structures
- Frequency Setting, Load Profiles and Fleet Requirement Calculation
- Bus Rapid Transit and Light Rail Option Comparison at Overview
- Land Use-Transport Interaction and Transit-Oriented Development Density Scenarios
- Station Catchment and Interchange Demand Estimation

Day 8: Accessibility, Corridor Studies and Stakeholder Engagement

- Accessibility Indicators: Cumulative Opportunities, Gravity-Based and Travel Time Isochrones
- Multimodal Corridor Performance Profile: Demand, Capacity and Reliability
- Corridor Option Long List and Sifting Criteria
- Stakeholder Mapping and Consultation Plan for Transport Schemes
- Presenting Forecast Uncertainty and Model Limitations to Decision Makers

Day 9: Appraisal, Emissions and Monitoring of Transport Plans

- Cost-Benefit Analysis: Travel Time Savings, Operating Costs and Benefit-Cost Ratio
- Optimism Bias Adjustment and Sensitivity Tests on Costs and Demand
- Multi-Criteria Analysis Scoring and Weighting of Economic, Equity and Environmental Effects
- Transport Emissions Estimation from Vehicle Kilometres, Speeds and Fleet Mix
- Post-Opening Evaluation and Plan Monitoring Indicator Framework

Day 10: Capstone: Corridor Transport Plan with Demand Forecast and Appraisal

- Corridor Case Brief: Growth Scenario, Problems and Objectives Confirmation
- Demand Forecast Run for Do-Minimum and Two Intervention Options
- Demand Management and Public Transport Package Selection with Evidence
- Appraisal Summary Table Combining Cost-Benefit and Multi-Criteria Results
- Corridor Transport Plan Presentation and Peer Challenge Panel

Skills You Will Gain:

- Transport Study Scoping
- Travel Survey Specification
- Zone and Network Coding
- Gravity Model Calibration
- Logit Mode Choice Estimation
- Demand Model Validation
- Transport Scheme Appraisal
- Corridor Option Sifting

Why Attend This Course:

- Return with a Corridor Transport Plan with Demand Forecast and Appraisal that can serve as a template for the next corridor or network study
- Question consultants' models by checking survey expansion, calibration targets, validation statistics and scenario assumptions
- Explain to boards and funding bodies why one corridor option is preferred, using forecast demand, benefit-cost results and multi-criteria scores
- Exchange modelling and planning practice with peers from road, public transport, municipal and consultancy organisations

Conclusion:

Transport plans hold up when the forecast behind them can be traced from survey data to trip tables to assigned flows. The first week builds that chain: study design, data, zoning and networks, trip generation, gravity distribution, logit mode choice, assignment, calibration and scenario forecasting. The second week adds what a model alone does not answer: demand management, public transport service planning, land use integration, accessibility, corridor studies, appraisal, emissions and stakeholder engagement. On the final day participants present a Corridor Transport Plan with Demand Forecast and Appraisal.