



AI in Urban Planning: Urban Analytics, City Digital Twins and Infrastructure Prioritisation



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Introduction:

Planning departments hold census tables, mobility traces, sensor feeds and satellite imagery, yet many zoning, growth and infrastructure decisions still rest on static projections and manual map review. AI in urban planning can forecast housing demand, predict travel flows, score asset condition and test development scenarios, but only when each model answers a clear planning question and is governed for bias, location privacy and procurement risk. This Core Concept course equips planning, infrastructure and mobility practitioners to specify, read and pilot these models. Participants produce an AI-Enabled Planning Use Case and Roadmap for a case city district.

Course Objectives:

- Build an urban data inventory and readiness score covering census, mobility, sensor, geospatial and imagery sources for a defined planning question
- Select and interpret machine learning models for land-use classification, built-up change, population growth and housing demand forecasting
- Interpret travel demand, traffic flow and ridership predictions to identify mobility service gaps in a district
- Rank infrastructure capital works using condition scores and deterioration forecasts produced by AI models
- Run city digital twin scenarios on density, road closure, heat and flood exposure and compare planning options
- Apply bias, explainability, location privacy and procurement controls when designing a governed AI pilot

Target Audience:

- Planners who prepare master plans, zoning changes and growth evidence for municipalities and development authorities
 - Municipal infrastructure staff who plan roads, drainage, water networks and capital works programmes
 - Mobility and transport analysts responsible for travel demand, traffic and public transport service planning
 - Urban data and GIS practitioners who supply spatial layers and analysis to planning teams
 - Resilience and environment officers who assess heat, flood and climate exposure in built-up areas
 - Digital programme staff who scope and procure analytics and AI pilots for city services
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Course Outline:

Day 1: Urban AI Foundations and the Planning Data Landscape

- Planning Decision Map: Where Machine Learning Adds Evidence to Plan-Making and Permitting
- Urban Data Inventory: Census Tables, Open Data, Mobile Phone Traces and Sensor Feeds
- Geospatial Layers and Satellite Imagery as Machine Learning Inputs
- Data Readiness Scorecard for a Municipal Planning Department
- AI Use-Case Screening Matrix: Planning Value, Feasibility and Public Acceptance

Day 2: Prediction Models and City Digital Twin Architecture

- Supervised Land-Use Classification From Parcel, Building Footprint and Imagery Features
- Built-Up Area Change Detection and Informal Settlement Growth Signals
- Population and Housing Demand Forecasting With Gradient Boosting and Cohort Inputs
- Urban Growth Simulation With Cellular Automata and Agent-Based Models
- City Digital Twin Architecture: Sensor Ingestion, 3D City Model and Simulation Engine

Day 3: AI for Mobility, Infrastructure Condition and Climate Exposure

- Travel Demand and Traffic Flow Prediction From Mobility Trace Data
- Public Transport Ridership Forecasting and Service Gap Detection
- Pavement, Pipe and Bridge Condition Scoring With Computer Vision and Failure Models
- Capital Works Prioritisation Using Risk-Weighted Deterioration Forecasts
- Urban Heat and Flood Exposure Mapping With Land Surface Temperature and Terrain Features

Day 4: Scenario Testing, Participation, Governance and Pilot Risk

- Digital Twin What-If Runs: Density, Road Closure and Green Cover Scenarios
- AI-Assisted Community Engagement: Comment Clustering and Arnstein's Ladder of Citizen Participation
- Algorithmic Bias, Spatial Equity and Explainability Checks for Planning Models
- Public-Sector Data Governance: Location Privacy, Data Sharing Agreements and Model Registers
- AI Procurement and Pilot Design: Vendor Evaluation, Success Metrics and Scale-Up Gates

Day 5: Case District Exercise: AI-Enabled Planning Use Case and Roadmap

- Case District Data Pack: Land Parcels, Mobility Counts, Asset Records and Heat Maps
 - Use Case Definition Canvas: Planning Question, Model Choice and Decision Owner
 - Model Output Review: Accuracy, Uncertainty and Planner Interpretation
 - AI Planning Roadmap: Phasing, Skills, Data Investments and Governance Controls
 - Roadmap Defence Before a Municipal Planning Review Panel
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Skills You Will Gain:

- Urban Data Readiness Assessment
- Land-Use Model Interpretation
- Housing Demand Forecasting
- Mobility Prediction Analysis
- Infrastructure Risk Ranking
- Digital Twin Scenario Testing
- Algorithmic Equity Review
- AI Pilot Scoping

Why Attend This Course:

- Leave with an AI-Enabled Planning Use Case and Roadmap for a case city district, ready to adapt to your own area
- Question vendor and consultant model outputs on accuracy, uncertainty and spatial bias before they shape a plan
- Move capital works and zoning debates from opinion to forecast-based evidence that councils can review
- Compare AI adoption practice with planners, engineers and mobility analysts from several city types and sectors

Conclusion:

AI adds value to planning when a clear question, reliable urban data and governed models come together. The course moves from the planning data landscape and use-case screening, through land-use, growth, demand and digital twin models, to mobility, infrastructure condition and heat and flood exposure analytics, then to scenario runs, AI-assisted engagement, equity, privacy and pilot procurement. The final day applies these methods to a case city district and produces an AI-Enabled Planning Use Case and Roadmap ready for review by a planning panel.
