Certified Specialist Programme in Sustainable Transportation Policy Evaluation

Data Analytics and GIS in Transport Planning

Abridged Traffic Models: These are simplified traffic models used to estimate traffic volume and other transportation-related metrics. They are often used in conjunction with other tools, such as GIS mapping, to provide a comprehensive view of transportation systems. Related terms include traffic simulation models and transportation demand models.

Access Management: This refers to the control of access points to a transportation network, such as on-ramps to highways or entry points to public transportation systems. Effective access management can help reduce congestion and improve safety. Related terms include traffic signal control and road geometry.

Activity-Based Modeling: This is a type of travel demand modeling that takes into account the activities that individuals need to perform, such as work, school, and shopping. It is used to estimate the number of trips that will be generated by a particular land use or transportation system. Related terms include disaggregate modeling and travel surveys.

Air Quality Analysis: This involves the study of the impact of transportation systems on air quality. It includes the analysis of emissions from vehicles and other sources, as well as the development of strategies to reduce those emissions. Related terms include emission inventories and air quality modeling.

Alternative Modes: These refer to modes of transportation that are alternatives to the single-occupant vehicle, such as bicycling, walking, and public transportation. Related terms include non-motorized transportation and multimodal planning.

Assignment Models: These are used to assign traffic to different routes in a transportation network. They are used to estimate the volume of traffic on each route and to identify areas of congestion. Related terms include traffic assignment and route choice.

Big Data Analytics: This refers to the use of advanced analytics and other techniques to analyze large datasets related to transportation systems. It includes the analysis of GPS data, social media data, and other types of data. Related terms include data mining and predictive modeling.

Bikeway Planning: This involves the planning and design of bicycle facilities, such as bike lanes and bike paths. It includes the analysis of crash data and other safety metrics. Related terms include bicycle safety and bikeway design.

Capacity Analysis: This involves the analysis of the capacity of a transportation system, including the number of vehicles that can be accommodated on a particular route or in a particular facility. It includes the use of queueing theory and other analytical techniques. Related terms include level of service and volume to capacity ratio.

Climate Change Analysis: This involves the study of the impact of climate change on transportation systems,

including the analysis of sea level rise and other climate-related metrics. It includes the development of strategies to reduce the carbon footprint of transportation systems. Related terms include greenhouse gas emissions and sustainability planning.

Congestion Management: This refers to the strategies and techniques used to reduce congestion on transportation networks, including the use of traffic signal control and ramp metering. Related terms include traffic management and incident management.

Data Visualization: This involves the use of graphical and other techniques to present data related to transportation systems in a clear and concise manner. It includes the use of maps and other visualizations to communicate complex data insights. Related terms include data storytelling and geospatial analysis.

Demand Modeling: This involves the use of statistical and other techniques to estimate the demand for transportation services, including the number of trips that will be generated by a particular land use or transportation system. Related terms include travel demand and mode choice.

Dynamic Traffic Assignment: This is a type of traffic assignment that takes into account the dynamic nature of traffic flow, including the impact of incidents and other events on traffic patterns. Related terms include real-time traffic management and traffic simulation.

Economic Analysis: This involves the analysis of the economic impacts of transportation systems, including the costs and benefits of different transportation options. Related terms include cost-benefit analysis and economic evaluation.

Environmental Impact Analysis: This involves the study of the impact of transportation systems on the environment, including the analysis of air quality, noise pollution, and other environmental metrics. Related terms include environmental assessment and sustainability planning.

Four-Step Modeling: This is a type of travel demand modeling that involves four steps: trip generation, trip distribution, mode choice, and route assignment. Related terms include travel forecasting and transportation planning.

Freight Planning: This involves the planning and analysis of freight transportation systems, including the analysis of commodity flows and other freight-related metrics. Related terms include freight transportation and logistics planning.

Geographic Information Systems: This refers to the use of GIS technology to analyze and present data related to transportation systems, including the use of maps and other visualizations to communicate complex data insights. Related terms include geospatial analysis and spatial analysis.

High-Occupancy Vehicle Lanes: These are lanes on highways that are reserved for vehicles with multiple occupants, such as carpoolers and bus riders. Related terms include high-occupancy toll lanes and managed lanes.

Incident Management: This refers to the strategies and techniques used to respond to incidents on

transportation networks, such as crashes and other events. Related terms include traffic management and emergency response.

Integrated Transportation Systems: These are transportation systems that integrate multiple modes of transportation, such as bus and rail systems. Related terms include multimodal planning and intermodal planning.

Intelligent Transportation Systems: These are transportation systems that use advanced technologies, such as GPS and real-time traffic management, to improve the efficiency and safety of transportation systems. Related terms include smart transportation and transportation technology.

Land Use Planning: This involves the planning and analysis of land use patterns, including the analysis of urban sprawl and other land use metrics. Related terms include urban planning and regional planning.

Level of Service: This refers to a measure of the quality of service provided by a transportation system, including the speed and reliability of travel. Related terms include traffic congestion and travel time.

Logistics Planning: This involves the planning and analysis of logistics systems, including the analysis of supply chains and other logistics-related metrics. Related terms include freight transportation and supply chain management.

Managed Lanes: These are lanes on highways that are managed to optimize traffic flow, including the use of dynamic pricing and other strategies. Related terms include high-occupancy toll lanes and express lanes.

Microsimulation Modeling: This is a type of traffic modeling that simulates the behavior of individual vehicles and other traffic elements. Related terms include traffic simulation and microscopic modeling.

Mode Choice Modeling: This involves the use of statistical and other techniques to estimate the choice of transportation mode, including the probability of choosing a particular mode. Related terms include travel demand and mode split.

Multimodal Planning: This involves the planning and analysis of multimodal transportation systems, including the integration of multiple modes of transportation. Related terms include intermodal planning and transportation systems management.

Network Analysis: This involves the analysis of networks, including transportation networks, to identify patterns and trends. Related terms include graph theory and network optimization.

Non-Motorized Transportation: This refers to modes of transportation that do not involve the use of motorized vehicles, such as walking and bicycling. Related terms include pedestrian planning and bikeway planning.

Origin-Destination Matrix: This is a matrix that shows the number of trips between different origins and destinations. Related terms include trip distribution and travel patterns.

Parking Management: This refers to the strategies and techniques used to manage parking facilities,

including the use of pricing and other strategies to optimize parking demand. Related terms include parking supply and parking demand.

Pedestrian Planning: This involves the planning and design of pedestrian facilities, including sidewalks and crosswalks. Related terms include pedestrian safety and walkability.

Public Transportation Planning: This involves the planning and analysis of public transportation systems, including bus and rail systems. Related terms include transit planning and transportation systems management.

Queueing Theory: This is a branch of mathematics that deals with the analysis of queues, including the analysis of waiting times and other queue-related metrics. Related terms include queueing models and stochastic processes.

Real-Time Traffic Management: This refers to the use of real-time data and other technologies to manage traffic flow, including the use of traffic signal control and ramp metering. Related terms include intelligent transportation systems and traffic management.

Regional Planning: This involves the planning and analysis of regional transportation systems, including the integration of multiple modes of transportation. Related terms include urban planning and transportation systems management.

Route Choice Modeling: This involves the use of statistical and other techniques to estimate the choice of route, including the probability of choosing a particular route. Related terms include traffic assignment and route optimization.

Rural Transportation Planning: This involves the planning and analysis of rural transportation systems, including the integration of multiple modes of transportation. Related terms include rural development and transportation systems management.

Signal Control: This refers to the use of traffic signals to manage traffic flow, including the optimization of signal timing and other signal-related metrics. Related terms include traffic signal control and intersection design.

Sustainable Transportation: This refers to modes of transportation that are environmentally sustainable, socially equitable, and economically viable. Related terms include green transportation and alternative modes.

System Management: This refers to the management of transportation systems, including the use of real-time data and other technologies to optimize system performance. Related terms include transportation systems management and intelligent transportation systems.

Traffic Assignment: This involves the assignment of traffic to different routes in a transportation network, including the use of traffic simulation and other techniques. Related terms include route choice and traffic modeling.

Traffic Calming: This refers to the use of design elements, such as speed bumps and narrow lanes, to reduce traffic speeds and improve safety. Related terms include traffic management and road safety.

Traffic Congestion: This refers to the condition of traffic flow, including the speed and volume of traffic. Related terms include traffic management and congestion mitigation.

Traffic Flow Theory: This is a branch of mathematics that deals with the analysis of traffic flow, including the analysis of speed and density relationships. Related terms include traffic modeling and transportation systems management.

Traffic Incident Management: This refers to the strategies and techniques used to respond to incidents on transportation networks, such as crashes and other events. Related terms include traffic management and emergency response.

Traffic Safety: This refers to the safety of traffic flow, including the analysis of crash data and other safety metrics. Related terms include traffic management and road safety.

Transportation Demand Management: This involves the use of strategies and techniques to manage transportation demand, including the use of pricing and other strategies to optimize travel behavior. Related terms include travel demand and mode choice.

Transportation Planning: This involves the planning and analysis of transportation systems, including the integration of multiple modes of transportation. Related terms include urban planning and regional planning.

Travel Behavior: This refers to the study of travel behavior, including the analysis of mode choice and other travel-related metrics. Related terms include travel demand and transportation planning.

Travel Demand Modeling: This involves the use of statistical and other techniques to estimate travel demand, including the number of trips that will be generated by a particular land use or transportation system. Related terms include trip generation and mode choice.

Trip Distribution: This involves the analysis of the distribution of trips between different origins and destinations. Related terms include origin-destination matrix and travel patterns.

Urban Planning: This involves the planning and analysis of urban systems, including the integration of multiple modes of transportation. Related terms include regional planning and transportation systems management.

Vehicle Routing: This involves the optimization of vehicle routes, including the use of GPS and other technologies to reduce fuel consumption and other costs. Related terms include fleet management and logistics planning.

Volume-to-Capacity Ratio: This is a measure of the ratio of traffic volume to capacity, including the analysis of congestion and other traffic-related metrics. Related terms include level of service and traffic management.

Walkability: This refers to the walkability of an area, including the analysis of pedestrian facilities and other walkability-related metrics. Related terms include pedestrian planning and bikability.