

CC307 - GIS for Intelligent Urban Transport Systems Course

Course Duration: 10 Days

Training Fee: KSH 80,000 | USD 800

Course Registration: [Register Here>>](#)

1.0. Introduction



As an important and smart applicable area, The Intelligent Transportation Systems (ITS) representing a major transition in transportation on many dimensions has attracted the substantial attention from GIS communities. Addressing how GIS and related technology are adapted for ITS at improving the traffic safety, the effectiveness of surface transportation systems, this course focuses on data organization of road network and integration with traffic data, as well as models for improving transportation efficiency. It will showcase how

advanced technologies in information systems, communications, and sensors are integrated with GIS and support the transportation system as an interconnected system of vehicle, driver and infrastructure within a certain social context by considering legislation, institution and organization.

1.1. Course Overview

The participants will learn about the background of ITS development, history and technical framework, and then fundamental technologies to upgrade different dimensions of transportation system using geographic information system, communication and control. The goal of these technologies can be more efficient operation of transportation, public transportation coordination, demand satisfaction for mobility and access, congestion prevention and pricing and pedestrian protection etc. During this module students will have a basic understanding of the emerging field of ITS and acquire basic knowledge of adopting GIS technology in transportation, such as how GIS and related spatial information technology application in ITS components: navigation system, spatio-temporal data management, spatial network analysis and services.

1.2. Course Content/Outline

- i. **Understanding ITS:** Understand the general concepts about Intelligent Transport System (ITS); Learn about the ITS development, applications and history.
- ii. **ITS Architecture:** Establish an overview of ITS architecture; Learn some example of implemented ITS; Recognize the importance of geo-spatial feature of ITS architecture.
- iii. **GIS Technology Supporting ITS:** Learn the GIS technology; Understand the role of geo-data, visualization, geo-modelling and their relation in ITS.
- iv. **Linear Reference Systems:** Learn linear reference system (LRS); Understand the spatial relation on LRS; Learn of requirements of ITS on road data.
- v. **Road Data & Road Network Organization:** Recognize road attributes and regulations on road; Learn data organization for road network & its topology; Network analysis (ArcGIS).

- vi. **Traffic Data Collection:** Recognize traffic data and their roles in supporting ITS; Understand temporal and dynamic characteristics of traffic data; Learn traffic data collection tech.
- vii. **Road Network Update Technology:** Learn the key role of road and road network in ITS; Learn the conception and process of road network update; Learn road network update technology based on trajectory points.
- viii. **Introduction to Car Navigation System and GDF:** Learn of Car Navigation System; Learn Data Model of Car Navigation System from GDF.
- ix. **Travel Navigation:** Introduction to travel navigation/guidance in navigation; Data content and organization; Travel navigation instance.
- x. **Moving Objects Databases:** Learn the spatial and temporal databases; Learn the moving objects databases.
- xi. **Traffic Modelling:** Learn general idea about traffic models; Learn about Cellular Automata (CA); Learn about Traffic Flow Model based on CA.
- xii. **Urban Traffic Simulation Model:** Learn urban traffic simulation model and example of traffic simulation; Recognize the role of GIS for traffic simulation.
- xiii. **Advanced Technology for ITS (Autonomous Driving):** Learn of Geospatial technology for autonomous vehicles; Discuss the relation of autonomous vehicles with ITS.

1.3. Expected Learning Outcomes

The participants of this training course will:

- i. Establish an overview of ITS architecture and recognize the interactions of people, vehicle, infrastructure & institution on ITS by learning the components of ITS;
- ii. Understand the role of GIS technology in supporting ITS through geo-spatial information integration, management and analyses, embodying a solution of information technology to complex issues;
- iii. Have the ability to link geo-spatial data with ITS and to complete simple tasks in GIS-related issues for ITS such as organization of road data, integration of traffic data with road segments and etc.;
- iv. Have a starting capacity for working in the ITS fields related with GIS and information technology by knowing general processes or methodologies for ITS issues.

1.4. Training Tools (Hardware and Software)

1. Handheld GPS & Smartphones;
2. Q-GIS; Google Maps APIs;
3. Cellular Automata and NetLogo;

1.5. Training Style and Approach

- ❖ On-site instructor-led training;
- ❖ On-line self-paced training (optional);
- ❖ Use of PowerPoint Slides;
- ❖ Use of Case Study Videos;
- ❖ Data Collection using phones, GPS etc.