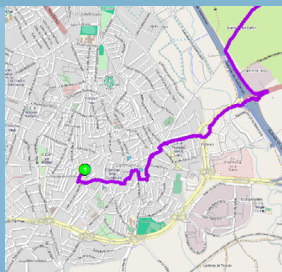
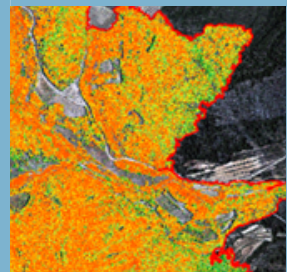
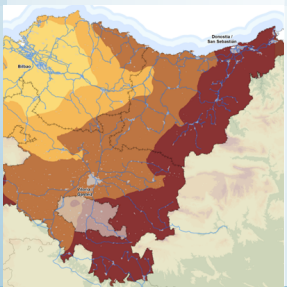
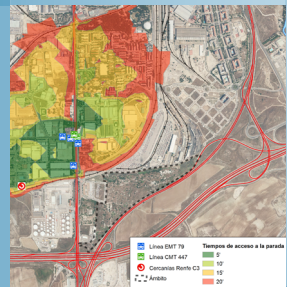
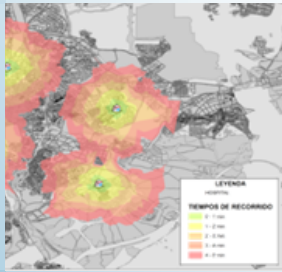
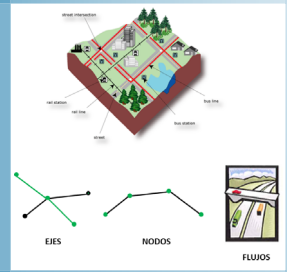
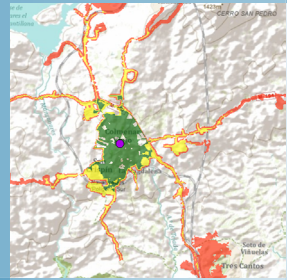
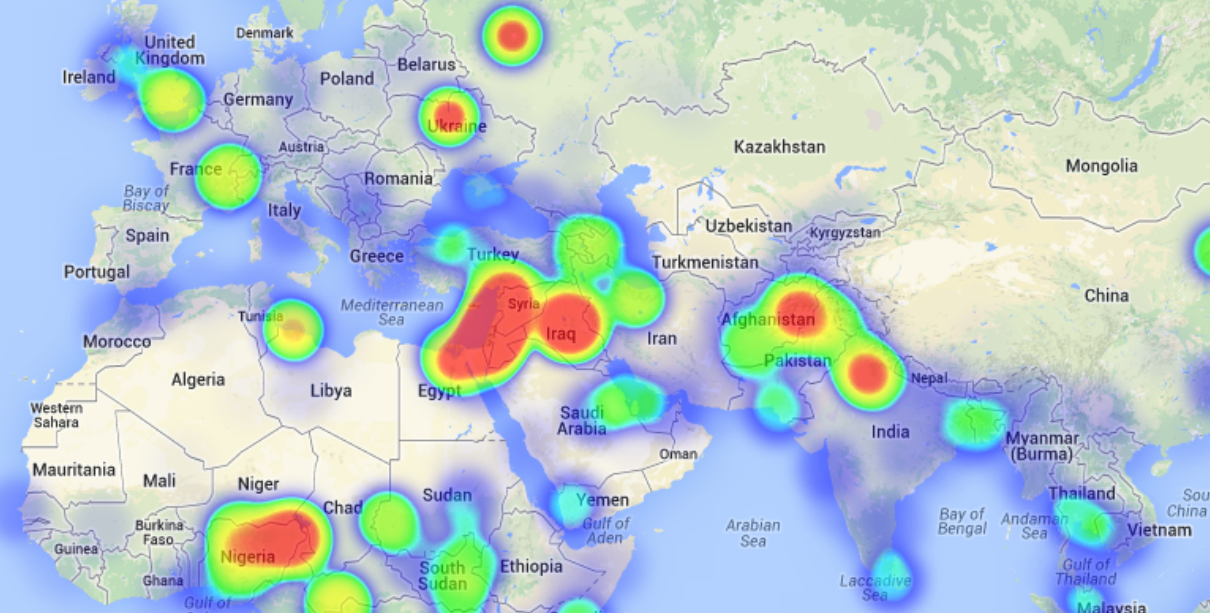
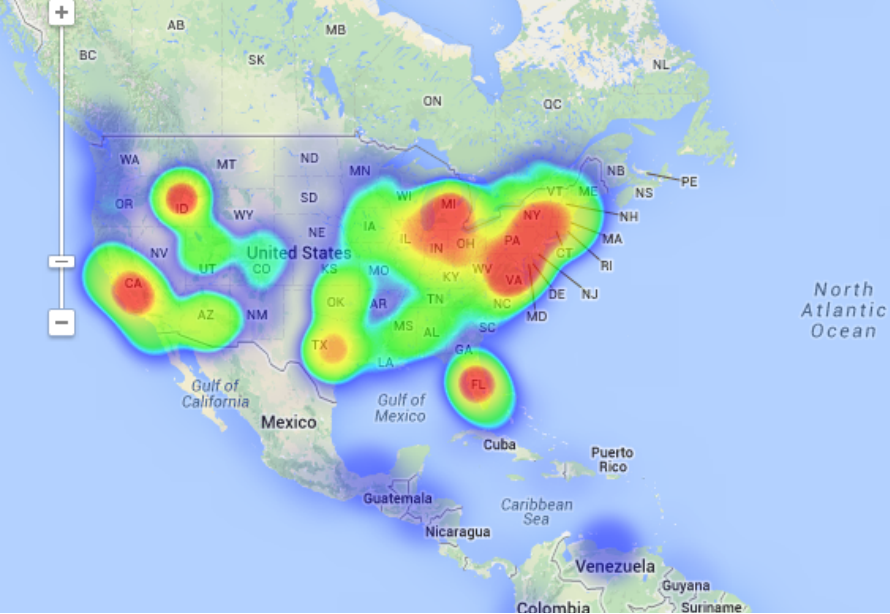


# NETWORK ANALYST EXTENSION USING ARCGIS PRO





## TRAINING OVERVIEW



This course will qualify students in ArcGIS PRO, particularly in the development of projects related to transport networks (roads, canalization, optimal routes, quickest way to get from point A to point B, accessibility issues, identifying a service area around a location, determine the least-cost network paths between several origins and destinations, etc.)

Network Analyst extension, offer the possibility to design a transport network (for private car, buses, for railway, metro, etc.) from scratch. They will learn how to perform accessibility studies, using different networks. Also they will be able to create a logical network system and calculate the best route, determine service areas, closest facilities, perform origin-destination cost matrix and location-allocation analysis, determine vehicle routing problems.



## GOALS



- Highlight the importance and utility of a Geographic Information Systems (GIS) especially in the elaboration of transport network studies, network analysis, accessibility issues.
- Design, manage and analyse a transport network, learn and integrate concepts such as commercial speed, accessibility and impedance.
- Gain the needed knowledge to generate impedances and attributes according to the type of network.
- Understand all the essential concepts needed for an advanced use of ArcGIS PRO Network Analyst extension.
- Obtain the best route plan, optimal location, accessibility analysis, etc.
- Design tools using Model Builder and apply them to network analysis.
- Study geomarketing concepts and perform essential analysis.



## ONLINE FORMAT METHODOLOGY

Enrolled students in this online course will have access to our virtual e-learning platform (which is available 24 hours), where they will find the content of the course, practical exercises, forum discussion and additional content. One of the advantages of this online platform, is that students can benefit of real time support and assistance offered by the instructor (2 hours per week), whom they can contact via direct messages, regarding course related issues, at any moment. They can also contact the instructor via email.

## STUDENT PROFILES



This course is aimed at students and professionals related to engineering, architecture, biology, geography, geology and environmental sciences interested in network management.

This course requires to have ArcGIS advanced knowledge, this is why it is recommended to have taken the “Advanced Geographic Information Systems course. ArcGIS Advanced (Vector and raster data model)”.

## INSTRUCTOR



### Ricardo García Álvarez

With more than 15 years experience in the cartography and geographic information systems sector, Ricardo holds a Bachelor’s degree in Geography from the Universidad Autonoma de Madrid and a Master in Geographic Information Systems from the Universidad Pontificia de Salamanca.



Ricardo has experience in transport networks project management, spatial accessibility studies with GIS, sustainable urban mobility plans, traffic studies (macro and micro simulation) and cartography development ( orthorectification, digital restitution and photogrammetric consulting).

As a teacher, he has given internal training courses for companies such as Tragsa (Tragsatec Group) or Prointec (Indra Group).



## 1 - INTRODUCTION TO NETWORK ANALYSIS WITH NETWORK ANALYST

Definiton

Network Types

- Geometric
- Transport

Logical Network

Network components.

- Nodes
- Axis
- Flow

**Guided exercise 1: Identify the types of networks and its components.**

## 2 - DESIGN OF A NETWORK

Digitise a specific network.

Required attributes for a transport network (frequency, commercial speed, distance) .

Network topology.

**Guided exercise 2: Create a simple bus network, fill in the necessary attributes and evaluation.**



## 3 - NETWORK ANALYST EXTENSION COMPONENTS

Network Analyst workflow

Network Analyst toolbar

Network Analyst window

Identifying a Network

Network symbology

**Guided exercise 3: Activate the network analyst extension, Windows preparation and getting used to the Network Analyst toolbar in ArcMap and evaluation.**

## 4 - GENERATING A NETWORK DATASET

Layers selection

Allowed turns and turn tables

Connectivity policy

Overpasses policy

Impedances

- Cost
- Descriptors
- Restrictions

Directions Windows

Definition of Network Analyst for specific mapping, once created

**Guided exercise 4: Generating a turn layer, generating the needed attributes for an overpass, description of impedances and evaluation.**

## 5 - GENERATING A NETWORK WITH COMMERCIAL MAPPING

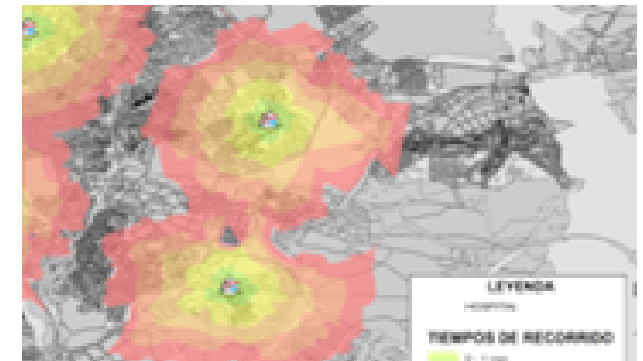
Advantages of using commercial mapping (HERE Nokia) and Street Data processing (specific impedances).

Identifying attributes (signals, turn restrictions, speed, travel duration, etc.).

Generating a Network DataSet for commercial mapping (Street Data processing).

Definition of Network Analyst for commercial mapping.

**Guided exercise 5: Generating a Network Dataset with ArcToolBox Street Data processing with commercial mapping of Colmenar Viejo (Madrid, Spain) and evaluation (Hoyo de Manzanares, Madrid, Spain).**





## 6 - NETWORK ANALYSIS

Network Analyst toolbox bar

Best route analysis.

Service area analysis. Isochrone maps or accessibility times.

Closest facility installation.

Origin - Destiny Matrix Analysis.

Vehicle routing problem analysis. Fleet analysis

Location - allocation analysis. Pick up / delivery routes.

**Guided exercise 6: Best delivery route for pharmacies, geomarketing study of clients for repair shops, accessibility to public transportation stops, etc.) and evaluation.**

**Evaluation.**

## 7 - PRACTICAL APPLICATIONS FOR DIFFERENT TRANSPORT NETWORKS

Territorial accessibility by private car.

Territorial accessibility by public road transport.

Coverage of the public transport stops (dispersion of time).

Public transport network optimization. Lines and stops.

Accessibility by railway transport.

**Guided exercise 7: About accessibility (mapping interpretation) and evaluation.**

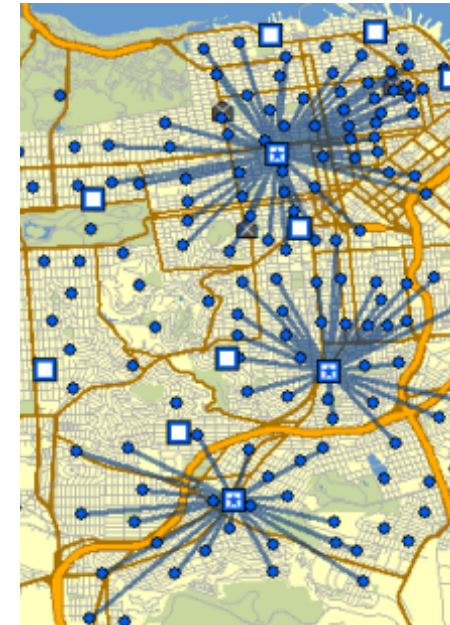
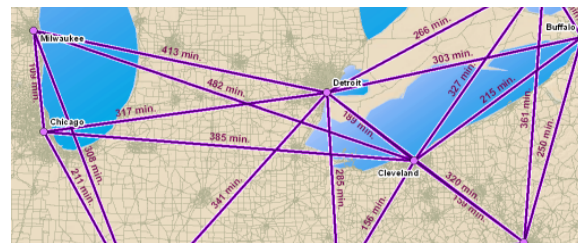
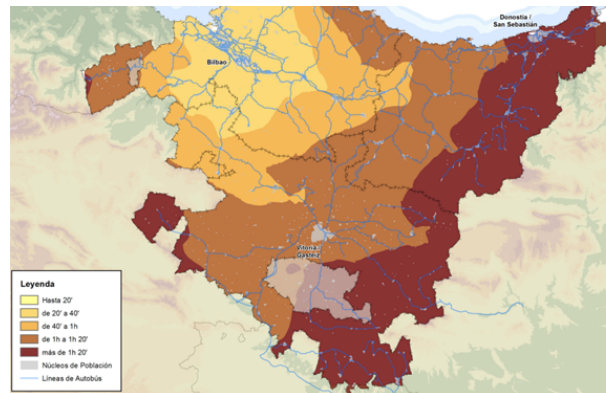
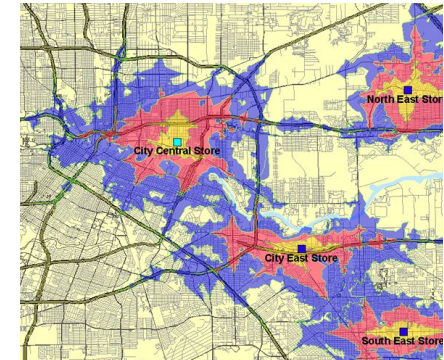
## 8 - GENERATING NETWORK GEOPROCESSING TOOLS WITH MODEL BUILDER

Introduction to Model Builder.

Automating the process to calculate influence areas of public transport stops.

Automating the process in the calculation of optimum locations.

**Guided exercise 8: Generating a tool and evaluation.**





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