ARCGIS COURSE, FROM BEGINNER TO ADVANCED LEVEL
ONLINE TRAINING

TG5-F

ArcGIS® Pro

TYC GIS Training

GIS Course.com
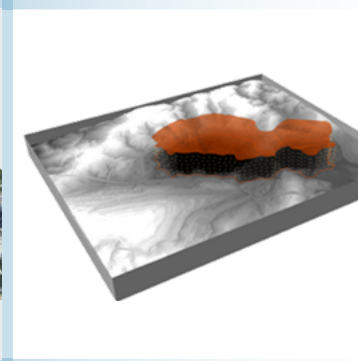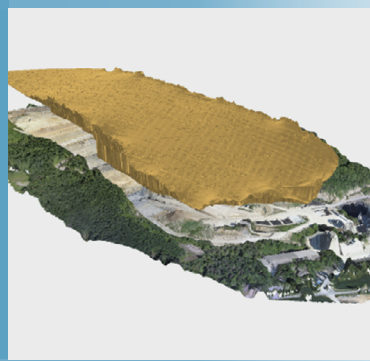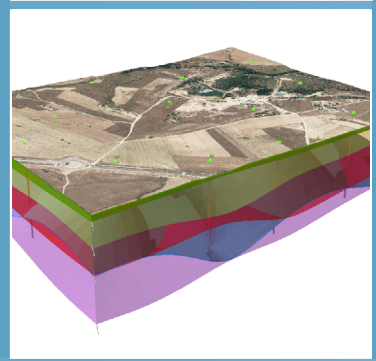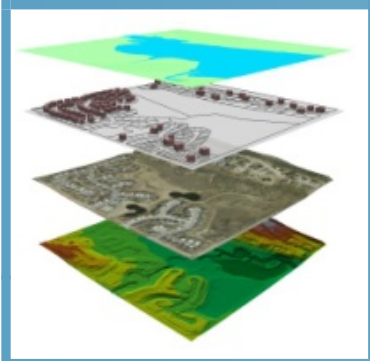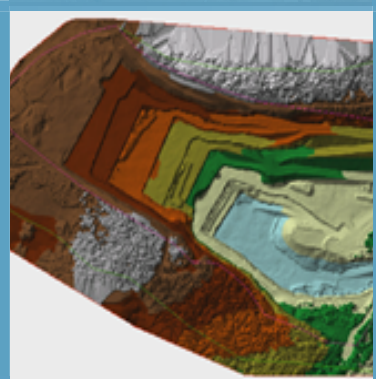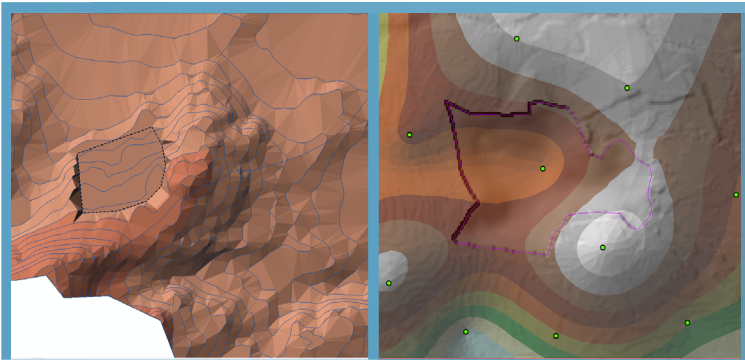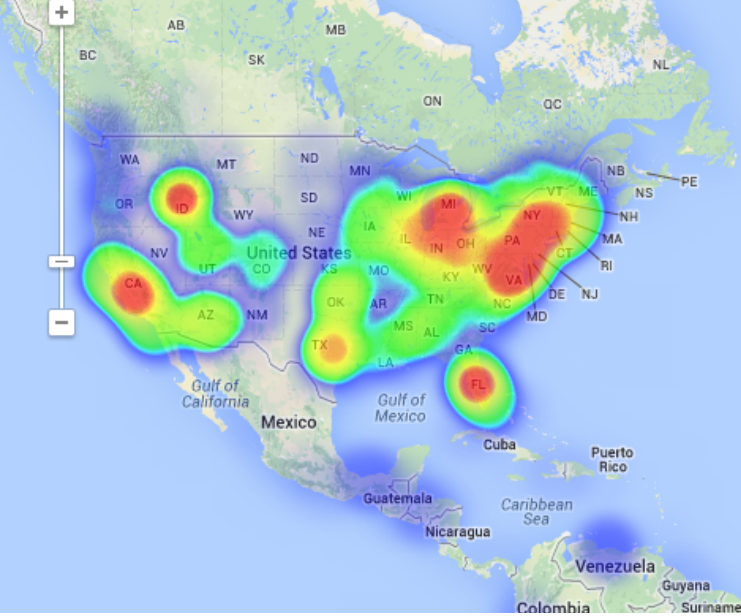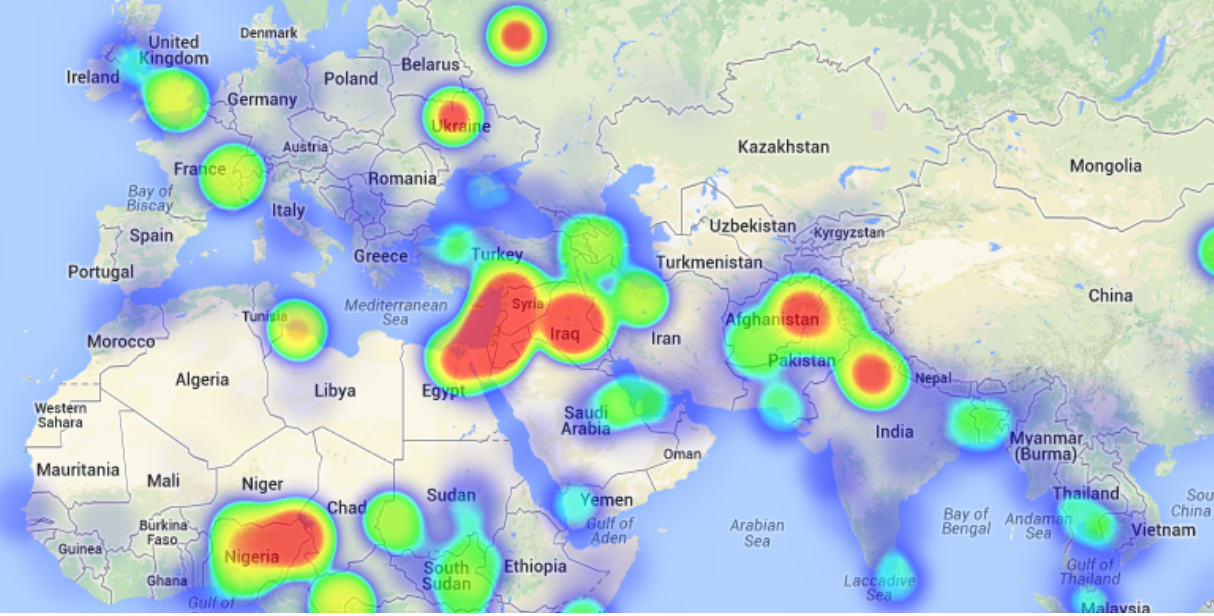
TRAINING OVERVIEW

This course will qualify students in the management of ArcGIS Desktop 10 and in particular, ArcMap, ArcCatalog and ArcTool Box, from a basic level managing and using vector data, databases and creation of cartography, to complex spatial analysis (Spatial analyst and 3D analyst), geodatabase, programming with ModelBuilder, creation of topology (Topology) and Network analysis.

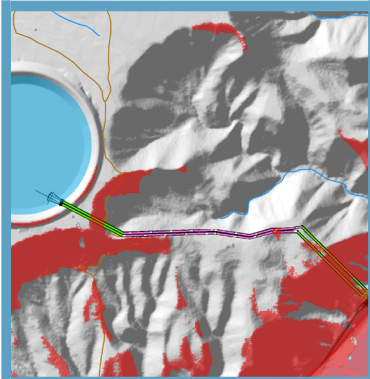Students will be trained in the creation and editing of vector information, geoprocessing basic tools, database management and its relationship with vector information, creation and editing of raster information, advanced multi-criteria analysis, the use of topology to correct of layers, and optimal routes and access times analysis. Adding to this, students will learn to create high quality cartography .

STUDENT PROFILES

This course is aimed at students and professionals related to engineering, architecture, biology, geography, geology and environmental sciences interested in the applications of Geographic Information Systems in their present or future professional activities.

GOALS

· Inform students about the importance and uses of Geographic Information systems (GIS)

· Provide the comprehension of the essential concepts for the management of ArcGIS Desktop

· Learn about GIS key tools for the correct use of vector information and for the development of complex spatial analysis.

· Teach through practical cases the existing difficulties in the execution of GIS studies, and their resolution.

· Creation of complex spatial analysis that will help in the engineering design, the location of projects, topography analysis, and a large number of applications.

· Creation of massive error correction topologies of vector layers and network analysis that will allow the creation of optimal routes, access times studies, etc.

· Instruct students through ModelBuilder in the development of complex tools based in the concatenation of ArcTool box tools.

· Train students in the preparation, layout and delivery of high quality cartography.

ONLINE FORMAT METHODOLOGY

The online format uses the online learning and technological platform Moodle, a telematics tool that works through the internet. It is a learning platform that provides students access to the training course content, fulfill the practical cases and consult the teaching staff, as well as availability to the resources and help at any moment.

The platform is available 24 hours a day, through which the student will be able to ask for help at any given moment. Instructors will reinforce the student´s autonomy during its training process, supporting and clarifying any possible doubts that may arise along the course.

Therefore, the course is carried out through different areas available on the online platform and where the student can search for training material, download information, complete the practical exercises and take assessments to verify the assimilated knowledge. The teachers will offer progressively the basic information needed to work towards the completion of a final practical case.

INSTRUCTOR

Santiago Pardini Herranz
With a Bachelor´s degree in Environmental Sciences and a Specialist certificate in Geographic Information Systems from the Universidad Politecnica de Madrid (Spain), Santiago has more than 5 years experience as a GIS Consultant / Technician.
He has experience in the development of GIS studies for diverse types of projects: hydraulic infrastructures, lineal structures, wind and photovoltaic installations, mining activities, land use zoning, fauna studies, etc.

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).

PART I. BEGINNER LEVEL

1 - INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS

Introduction.

Definition and basic concepts.

Uses of Geographic Information Systems.

Geographic information: vector data models, raster data models and other data models (CAD, TIN, etc.). Main features of each data module, advantages and disadvantages.

Introduction to ArcGIS Desktop: ArcMap, ArCatalog, ArcToolbox, ArcScene and ArcGlobe and ArcGIS Pro

Arcmap interface, extensions and tools.

Guided exercise: Verify the functionality of the software.

2 - VECTOR DATA MODEL. INFORMATION DISPLAY

Information layers: how to add layers, features and attribute tables.

Data tools: search and queries.

Selection tools: selection per feature, selection by spatial location and capture information.

Layer symbology: basic symbology, by category, by quantity and through graphics.

Other display options: labelling and transparencies.

Guided exercise: (load layers, types of selection, symbology) and assessment.

3 - COORDINATE SYSTEMS, PROJECTIONS AND GEOREFERENCING

Introduction to Coordinate systems and projections.

Defining Coordinate Systems.

Coordinate system transformation. Reprojection of ED50 or ETRS89 geographic databases.

Image, layer and CAD files georeferencing.

Guided exercise: (define, project, image georeferencing and CAD) and assessment.

4 - VECTOR DATA MODEL. EDITING AND CREATING INFORMATION

Creation and editing of spatial data.

- Creation of spatial data: Editing tools bar. Digitization techniques.

- Exporting and importing spatial information files from different formats (CAD, DGN, Shp, ASCII, etc.). Create layers from CAD files.

- Modify existing layers.

- Creation of layers from coordinates.

Creation and editing of data in the attribute table:

- Structure of the Attribute table.

- Types of data included in an attribute table.

- Modify information from a table.

- Calculate geometric information (Surface, perimeter, length, etc.).

- Creation of statistics from the table.

- Export tables to Excel and other formats. Creation of reports and graphics.

Practical exercises (create layers, digitize, modify attribute tables, add fields, geometric calculations, field calculator) and assessment.

5 - DATABASE MANAGEMENT

Designing databases.

Joining and relating databases.

Spatial joins. Obtain statistics from database information and spatial position of elements in a layer.

Guided exercise: (join database and spatial relations) and assessment.

6 - SPATIAL ANALYSIS. MOST COMMON GEOPREOCESSING TOOLS.

Extract Toolset (Clip, Split).

Overlay toolset (intersect, union).

Proximity toolset (buffer analysis, Thiessen polygons).

Multi-criteria analysis. Obtaining optimum areas according to several criteria.

Guided exercise: (spatial analysis) and assessment.

7 - MAP PRODUCTION

Adjusting the size and type of sheet.

Inserting elements: north, scale bar, numeric scale, map legend.

Including other elements: images, graphs and tables.

Adding several data frameworks

Creation and use of templates.

Printing options

Guided exercise: Creation of a map.

PART II. ADVANCED LEVEL

1 - INTRODUCTION TO RASTER DATA MODELS

Introduction.

Definition and basic concepts.

Purposes and uses.

2 - BASIC OPERATIONS WITH DATA MODELS

File conversion:

– Converting files from vector to raster, and vice versa

– Converting ASCII or html files to raster

– Converting vector files to TIN

– Converting TIN to Raster formats

– Exporting files to KML (Google Earth) and CAD

– Creating Digital Elevation Models from vector data, ASCII and TIN files.

Extracting information from raster files

– By query

– By mask or entity

– Joining raster files.

Practical exercise: (convert files, create digital elevation models) and assessment.

3 - 2D AND 3D SPATIAL ANALYSIS

Raster files reclassification. Building Boolean layers, adding values to intervals or categories, and data conversion.

Grouping several raster layers. Algebra map, math calculations between raster layers, field statistics.

Data interpolation. Exploring different interpolation tools (IDW, Kriging, Natural neighbor).

Euclidean distances.

Surface: contour, slope calculation, hillshade, orientation and visibility.

Use in hydrology: obtaining a drainage system, flow direction, outlets, and identification of drainage basins or sub-basins.

Volume calculation.

Raster multi-criteria analysis: Basic concept and weighting.

Least-cost routes.

Practical exercise: Interpolation of radiation data, volume calculations, complex multi-criteria analysis and least-cost route calculation.

4 - 3D DATA DISPLAY (ARCSCENE)

Converting vector files from 2D to 3D.

Vector and raster layers display in 3D.

Virtual flights.

Practical exercise: Visibility of fire protection towers, volume of soil extracted from a quarry and 3D representation.

5 - MODEL BUILDER

Use.

Linking of geoprocessing models using Model-Builder.

Creation of custom tools using ArcToolBox.

Practical exercises (creation of a geoproeces-sing model with ModelBuilder) and assessment.

6 - GEOSPATIAL DATABASE. GEODATABASE.

Geodatabase: advantages. Properties.

Loading data to the geodatabase.

Domains and subtypes.

Practical exercises (creation and management of the geodatabase) and assessment.

7 - TOPOLOGY

Massive correction of geospatial data errors.

-Topology considerations.

-Cluster tolerance.

-Most common rules in topology.

-Validating a topology.

-Topology errors.

Management of errors.

Practical exercises (errors management and massive correction) and assessment.

8 - NETWORK ANALYST

Definition

Network categories:

- Geometric networks

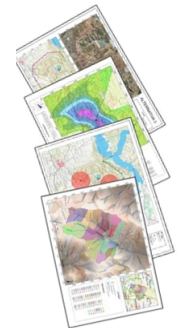- Transportation networks

Network components.

- Nodes

- Axis

- Flow

Creating a network dataset

- Operators.

- Optimal route.

- Service areas.

- Closest facility.

Origin destination (OD) cost matrix.

Practical exercises (creation of a network dataset, route calculation, buffer are as) and assessment.

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