QGIS AND GRASS COURSE - FROM BEGINNER TO ADVANCED

ONLINE TRAINING

GRASS GIS

TYC GIS Training

GIS Course.com
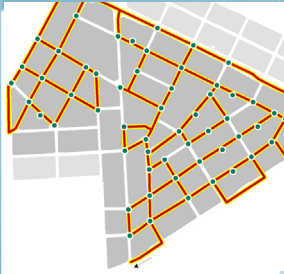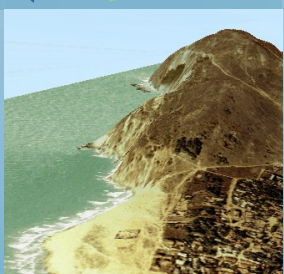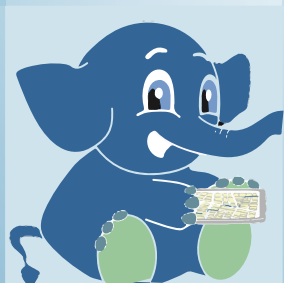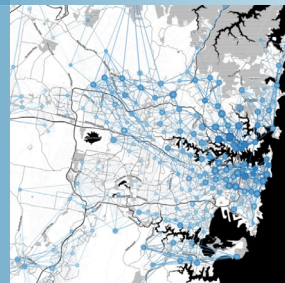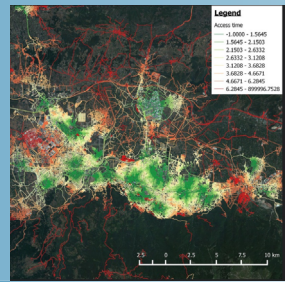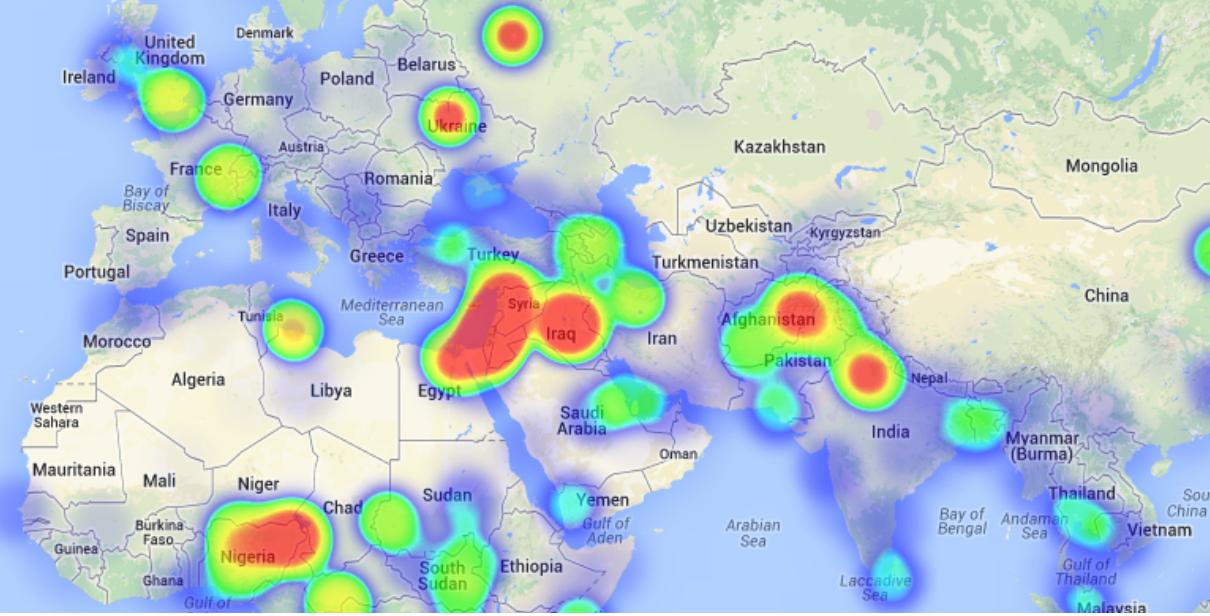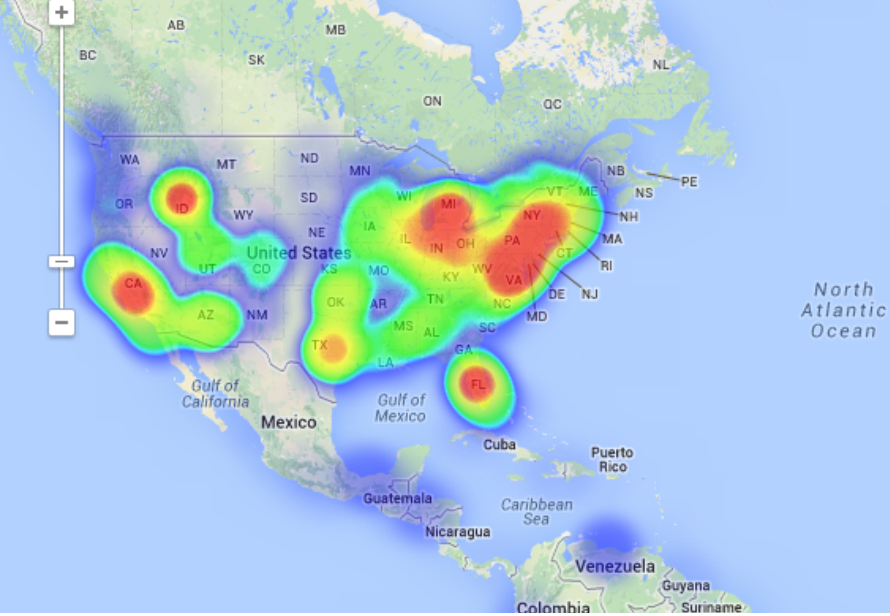
COURSE

The main purpose of the course is to provide training, from beginner to advanced levels in QGIS, a free and open source desktop geographic information system software, with a complex working environment which allows users to analyze and edit spatial information. QGIS supports multiple types of data (vector and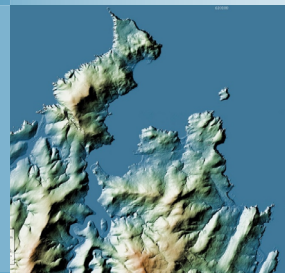 raster formats), web services, providing in the same time, a variety of useful commands and utilities for geo-processing due to its integration with GDAL and OGR libraries. QGIS links also with other open-source GIS packages, including GRASS GIS (Geographic Resources Analysis Support System), extending its capabilities to digital satellite image processing and analysis.

The course is structured in units with different levels of difficulty that comes in help of the student who will learn the general concepts of a Geographical Informational System, working with vectorial, alphanumeric and raster data, handling the geo-processing tools and map creation.

GOALS

· Highlight the importance and utility of a Geographic Information System (GIS), its integration and applicability in a variety of professional sectors.

· General overview about the basic skills needed in QGIS and GRASS GIS handling and essential concepts used by a GIS system.

· Learn about GIS key tools in an appropriate and professional way, usage of vector and raster data information in order to develop complex spatial analysis.

· Find about all possible difficulties which you may encounter in the execution of GIS projects, and their solutions through practical exercises.

· Gain experience in data preparation, layout development, map creation and high quality products delivery.

· Start programming with Python and develop your own complex tools to facilitate your work.

METHOLOGY

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.

STUDENTS PROFILES

The course is aimed at students and professionals in Engineering, Architecture, Biology, Geography, Geology and Environmental Sciences who are interested in the application of Geographic Information Systems in their present or future professional activities.

INSTRUCTORS

Alberto Holguín Asensio

Alberto Holguín Asensio holds a Bachelor Degree in Environmental Sciences and has more than 10 years of experience in the field of Remote Sensing and GIS applications regarding natural resources and environmental management. In addition, he also holds teaching skills and extensive experience as a trainer and instructor due to his involvement with Foundation for the Promotion of Industrial Innovation, Castilla-La Mancha University and the European Social Fund.

Alfonso Noriega Díaz

With a Bachelor's Degree in Environmental Sciences and a Master in Safety, Hygiene and Ergonomics from University of Almeria, Alfonso has an extensive experience in GIS/CAD and topography training programs.
His expertise extends also on private sector as he worked as a co-director in final career projects and PRL Technician during the construction of "Helios Campos de San Juan I y II".

INSTRUCTORS

Ricardo Gárcia Álvarez

With a Bachelor´s Degree in Geography from Autonom University of Madrid and a Master in Geographic Information Systems from Pontificia University of Salamanca, Ricardo is a Specialist in GIS/Remote Sensing business, with more than 15 years of work experience.

His area of expertise extends over transport networks project management, spatial accessibility studies with GIS, sustainable urban mobility plans, traffic studies (macro and micro simulation) and cartography products development (orthorectification, digital restitution and photogrammetry consulting). As an instructor he is responsible for the training program in different private companies like Tragsa (Tragsatec Group) or Prointec (Indra Group).

Beatriz Ramos López

Beatriz holds a Bachelor Degree in Biology at University of Sevilla, a Master in Geographic Information Systems and another one in Geographic Information Technologies, both of them at the University of Alcala. She has experience in the execution of Web GIS related projects, in the usage of open source software products and in the development of cartographic viewers.
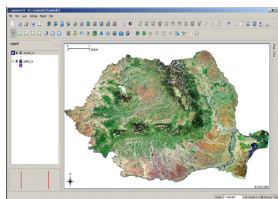
TYC GIS
Training

BLOCK I
QGIS BEGINNER

INTRODUCTION IN QGIS

About QGIS
Characteristics of QGIS
Start using QGIS

QGIS TOOLS

QGIS Configuration
General tools
Working with projections
QGIS Browser

VECTOR DATA MANAGEMENT AND TABLES

Introduction
Vector and alphanumeric data visualization
Editing data
Working with Vector Data
Working with tables

Practical exercise 3: Working with vector data and tables, operations with vector and alphanumeric data.

WORKING WITH RASTER DATA

Introduction
Display raster data
Raster calculator
Working with images

Practical exercises 4: Working with raster data and operations with images.

QGIS PLUGINS

Additional modules of QGIS or "plugins"
Description of Plugins incorporated in QGIS
Operations through "plugins"

Practical exercises 5: Different QGIS "plugins" and their applications: GDAL library tool, georeferencing, coordinate capture, format converter.

INTEGRATION WITH GRASS GIS
GRASS plugin
Loading raster and vector data
GRASS tools
Create and edit vector layers
Work with raster data

Practical exercises 6: Handling GRASS tools: Location, Mapset, etc.

CREATE MAPS AND RELATED PRODUCTS

Creation tools
Graphic elements
Atlases generation
Graphic output creations

Practical exercises 7: Map creation with QGIS.

BLOCK II
QGIS ADVANCED

RELATIONAL DATABASE MANAGEMENT SYSTEMS AND SPATIAL DATA.

Database design
Database connections, Table joins
Spatial joins, generate new statistics and new data using table and spatial data information

 POSTGRESQL and POSTGIS
Different types of data that can be included in a database
How to install PostgreSQL. How to use PostGIS in OpenGeo Suite
Create and manage data in PostGIS
How to handle PostGIS in OpenGeo Suite. Import and export shapefiles (layers)

Practical Exercise 1: Creation and management of Databases.

SPATIAL ANALYSIS USING VECTOR DATA

Geo-processing tools for vector analysis
Generating sampling grids
Multicriterial analysis

Practical Exercise 2: Generating sampling grids for the study of population evolution and density.

Basic operations with raster data
Conversion tools: Raster, Vector, ASCII, KML.
Generate digital models of elevation using vector data, ASCII and TIN files.
Querying and masking raster data for obtaining new information
Merging raster files

Practical Exercise 3: File conversion and Digital Terrain Models development.

ADVANCED SPATIAL ANALYSIS USING RASTER DATA

Reclassify rasters, euclidean distances, boolean operations on layers, raster aggregation and data conversion
Map algebra (Raster calculator), mathematical operations between rasters, cell statistics
Data interpolation techniques (IDW, kriging, natural neighbor)
Contour, slope, hillshade, aspect and visibility maps
Hydrological study: drainage networks, flow direction, watershed basins, catchment areas
Performing Multicriteria raster analysis, basic concepts and weights (the most important component of the MCDA model), weighted layers' combination, non-compensatory analysis, least cost path analysis

Practical Exercise 4: Viewshed Analysis, hydrological analysis and advance multicriteria analysis.

3D VISUALISATION

Convert 2D data to 3D data
Genereate 3D profiles
3D Visualisation of raster and vector data
Map animations
Practical Exercise 5: 3D scene generation.

NETWORK ANALYSIS USING PGROUTING
Graph Generation
Introduction
Network elements
Impedances
Necessary attributes

     Length (Distances)
     Speed
     Time
     Address (one way)
     Cost/reverse cost

RDBMS PostgresQL/PostGIS
Topology
     Graphs
     PostGIS

Routing calculations with the QGIS
Pgrouting tool
Simple route
Calculating shortest routes with pgRouting.
     pgr_Dijsktra
     pgr_kDijstra
     pgr_aStar
     pgr_drivingDistance
     computation of Isochrones pgr alphaShape

Practical Exercise 6: Routes calculation with pgRouting.

PYTHON PROGRAMMING LANGUAGE (PYQGIS)
Variables, data types, reserved words, operations to perform
Lists, tuples, dictionaries, classes
Loops and conditions
How to integrate Python in QGIS
PYQGIS and PYQT. Two APIS for QGIS
What is an API and what does it include?
Step by step explication of code components
Functionality of pyQGIS
Functionality of pyQT

LIDAR DATA MANAGEMENT IN QGIS

QGIS and Lidar. LSTOOLS

     How to install LSTOOLS for QGIS
     Configuration
     2D and 3D visualization for Lidar data

QGIS and Lidar. FUSION
     How to install FUSION for QGIS
     Configuration

Processing Lidar data in QGIS
     DEM Generation
     Relief maps
     Slope maps

DEVELOPMENT OF A CARTOGRAPHIC VIEWER IN QGIS

What is a cartographic viewer?

Plugins tools in QGIS for viewer development
QGIS Cloud

EVALUATION: DEVELOPMENT AND PUBLISHING OF A CARTOGRAPHIC VIEWER ON THE WEB. USE OF SOCIAL NETWORKS

TYC GIS Training

GIS Course.com

📞 (+34) 910 325 482   ✉ training@tycgis.com

Calle Fuencarral 158,
Entreplanta, Oficina 16-17
28010 Madrid

TYC GIS MÁLAGA
Avda. Pintor Joaquin Sorolla 137, 1° D
29017 MÁLAGA

TYC GIS MÉXICO
Tequesquitengo 4, Fracc. Cuaunáhuac
C.P. 62450,
Cuernavaca, Morelos.

TYC GIS PANAMÁ
Calle Eusebio A. Morales
El Cangrejo
PH Neo Plaza Oficina 2015