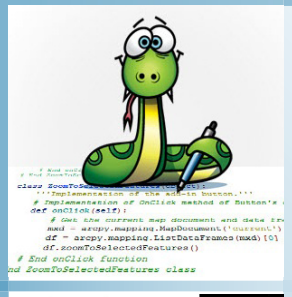
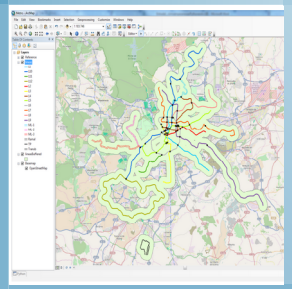
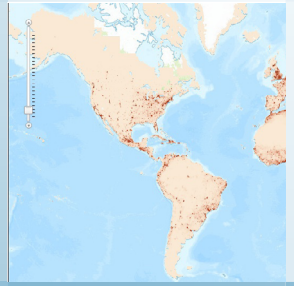
WEB GIS DEVELOPER SPECIALIST

ONLINE TRAINING







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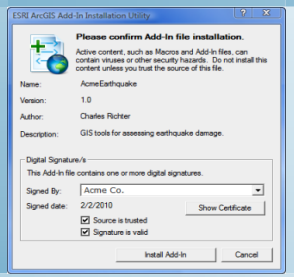
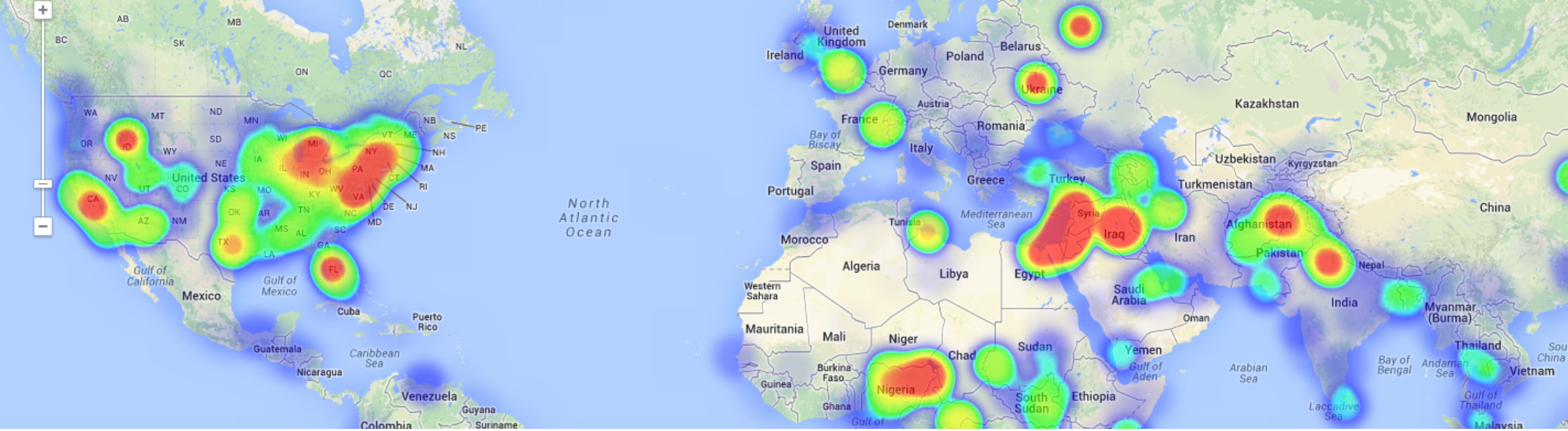


ESRI

ArcGIS ESRI

TYC GIS Training

GIS Course.com



COURSE

This course is destined to those who want to specialize in GIS programming languages and become a professional developer. The training material is focused on: programming languages like JavaScript, a very powerful tool for developing cartographic viewers, developing new tools through ArcObjects and learn coding with one of the most used programming language by all GIS communities, Python.

The course content is well structured providing a complete training and integration with all ESRI development tools.

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.

GOALS

- Offer specialized training that focus on the programming languages ESRI products are based on.
- Work with ArcGIS API for JavaScript, create web maps and publish them online through ESRI ArcGIS Server.
- Learn programming using Python and develop useful tools and scripts for automating GIS workflows.
- Find out about ArcObjects work environment and its straightforward role in ArcGIS.
- Perform practical exercises that will allow you to practice your new skills and develop your own Web GIS project.

PERFILES

The course is aimed at professionals of the GIS world who, with knowledge or not of programming, want to know all the possibilities that programming with ArcGIS offers.

METHOLOGY

Our online courses, are distributed via Moodle, the world's most popular learning platform. It is a highly flexible Learning Management System that can be used to conduct and access courses, accomplish tasks of practical exercises, interact face-to-face to the teaching staff or benefit of support and resources at any time.

The online platform can be accessed 24 hours a day, in which the student will be able to ask for help at any given moment. The instructors will act as supervisors during all the training process, offering support for any possible difficulty encountered by the students along the course.

The course is structured in different modules, making it easy for the student to search for training material, download information, complete practical exercises and take assessments in order to verify their new gained abilities. The instructors will assist the students throughout all the course period, offering progressive help and information according to their evolution.

INSTRUCTORS

Alberto Santos Estévez

Consultant and Geospatial Developer with more than 15 years' experience in GIS integrated solutions and high performance systems.

Chencho Martín Lagunas

GIS Developer with extensive experience in Full-Stack software development, specialized in GIS data analysis and pre-processing using Python.

PROGRAM

PART I: INTRODUCCIÓN

PART II. ESRI - ARCGIS API FOR JAVASCRIPT

INTRODUCTION TO JAVASCRIPT PROGRAMMING LANGUAGE

Debugging Applications
What is Firebug?
Using Console and Script tabs
Highlighting HTML Elements
Using CSS tab
Debugging JavaScript code
Error monitoring & reporting
DOM Tab
RED Tab
Documentation

WORKING WITH DOJO AND ARCGIS SERVER

Introduction to Dojo
Dijit
Dojox
Dojo architecture
Integrating Dojo with ArcGIS Server
ArcGIS Server resources
Initialization script
Templates
Dojo base and Dojo core
Type checking
String utilities
Array processing
JavaScript events and Dojo. What are the events?
dojo.connect ()
Managing events
Should we record all the events?
Mouse and Keyboard Event Normalization
Publish/Subscribe Event Mechanism

ARCGIS SERVER FOR DEVELOPERS

What is ArcGIS Server?
GIS resources and services
ArcGIS Server components
ArcSDE
ArcGIS Server editions
What's new in ArcGIS Server 10.1.
What's new in ArcGIS Server 10.3.1

INTRODUCTION TO JAVASCRIPT API FOR ARCGIS SERVER

Aptana plugin
Short overview of JavaScript API for ArcGIS Server
Why JavaScript?
Working with maps
Tiled and dynamic/feature layers' services
Working with map extension
Working with graphics and graphic layers
Feature layers
Drawing graphics and elements
Map events
Info window
Adding toolbars
Controls (widgets)
Editing
Design a basic application
ArcGIS templates
API configuration parameters

ADVANCE TECHNIQUES USING JAVASCRIPT API FOR ARCGIS SERVER

Introduction to ArcGIS Server tasks
Performing Spatial and Attribute Queries
Identifying Entities
Finding elements
Perform geocoding and reverse geocoding
Geometry Service
Route Task and Network analysis services
Geoprocessing services
Working with spatial data
Multiple types of layers
arcgis.com integration
Using proxy with ArcGIS API for JavaScript
Working with secure services

GOOGLE AND BING MAPS INTEGRATION

ArcGIS Server extension for Google Maps
Add an ArcGIS Server Dynamic Map Service to Google Aps
Creating a query layer
Search features
Identify features
Geocoding
Geometry Service
Geoprocessing services

ADVANCED RESOURCES OF DOJO

Introduction
Accessing Multiple Data Formats with the Dojo Data API
Working with JSON
Reading JSON Data with Dojo
Working with XML Data
How to read CSV file
Ajax for client-server communication
dojo.xhr
Cross Domain Scripting Issues & JSONP
Using Iframe
JSON-RPC
User interface manipulation using DOM
Display a simple dialog box and store input data from user
Advanced Dijit Selects with Dojo
Create dynamic graphs and charts using Dojo
Display Image with Dojo

ADVANCED DESIGN TECHNIQUES FOR MAP APPLICATIONS

User-centered design (UCD)
KISS Design principles
Prototypes

INTRODUCTION TO USER INTERFACE DESIGN. CSS BASICS

What is User Centered Design?
CSS Syntax
Comments in CSS
ID selectors
Class selectors – CSS
External Style Sheet
Internal Style Sheet
How to add CSS styles to HTML code
Cascading Style Sheets
CSS Backgrounds
CSS Text
Font styles
Link styles
List styles
Use an image as a list marker
Table styles
Design better data tables
CSS Box Model

ADVANCED STYLING WITH CSS

Grouping Multiple CSS Selectors in One Style Property
CSS Display and Visibility
CSS Sizing
CSS Positioning
Overlapping elements in CSS
Floating Elements with CSS
CSS Image Transparency
CSS image hover effects

PROGRAM

USER INTERFACE DESIGN FOR IPHONE AND IPAD
Compact development (compact build)
Initializing Display Parameters
iOS Gestures
Map interaction using IOS gestures
API Geolocation
Dojox.mobile

THE NEW JAVASCRIPT API 4.X
What does the new version provide?
Limitations

CONSTRUCTORS PROGRAMMING
What is a constructor in programming?
Constructor proprieties
Collections
Promise Object

MAPS, VIEWS AND LAYERS
Maps and Views
The new API version, MapView, SceneView and LayerView
Maps as a data sources
Web Mapping: Building Great Web Maps and manipulate data
Maps and Layers. Types of Layers:
GraphicsLayer
FeatureLayer
MapImageLayer
SceneLayer
VectorTileLayer
GroupLayer
How to access feature data via LayerView object?
Working with FeatureLayer object

WORKING WITH 3D SCENES
Scenes and Web Scenes. How to add a Web Scene to your application?
Use Topographic Elevation Data to Create a 3D Map
Edit the Scene View: Camera & Environment
Display Sun and Shadows
Local Scenes
How to add Scene layers?
3D representation and symbology. Use of Visual Variables
Symbologies

PART III. PROGRAMMING IN ARCGIS WITH PYTHON

FIRST STEPS WITH PYTHON AND ARCGIS
Create a Python script file
Comments
Variables and types
Strings
Numbers
Lists
Dictionaries
Statements
Python - Decision Making - if statements
Loop Statements
Python File I/O - Read and Write Files in Python
Modules

PYTHON PROGRAMMING LANGUAGE
The geoprocessing framework in ArcGIS
What is Python?
Introducing Python using the Python window in ArcGIS
Python Development Environment
Integrate Python in the Geoprocessing environment

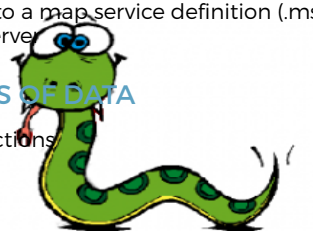
WHAT IS ARCPY?
Introduction to ArcPy
Data access module - arcpy.da
Accessing geoprocessing tools
ArcPy Features
ArcPy Classes
ArcPy Modules
Importing ArcPy
Python and ArcPy versions

ENVIRONMENT CONFIGURATION
Getting and setting environment settings
Most used configurations/settings
Environment settings
Environment levels and hierarchy
Switch from application to tool
Scripts
“Env” class

ARCGIS GEOPROCESSING SERVICES AND TOOLS IN PYTHON
Introduction to Geoprocessing tools
Toolbox names, labels and alias
Understanding tool syntax
How to use Geoprocessing tools
Tool examples
Buffer
Append
Help
How to Create a Custom Tools
Exploring and working with toolboxes

ERROR HANDLING
Error messages
Understanding message types and severity
Receive and Respond to a Text Message with Python
Result Objects
Python - Exceptions Handling and how to manage them
Python exception message capturing
Event notification system
Handling special cases
Exploring the default Python error message
try statement
try/except/else
try/finally
raise

INTRODUCTION TO ARCPY.MAPPING
What is arcpy.mapping?
Using arcpy.mapping to control map documents and layer objects
Getting a list of layers in a map document
DataFrame
Fixing Data Sources
ListTableViews
ListLayoutElements
Adding, Working and updating layers in a map document
Printing or exporting maps
Export and print map documents to PDF using Python
Publishing a map service to ArcGIS Server
Use the arcpy.mapping function AnalyzeForSD to analyze your draft service
Converts a map to a map service definition (.msd) file
PublishMSDToServer



CREATE LISTS OF DATA
Introduction
List of ArcPy functions
Field
Index

PROGRAM

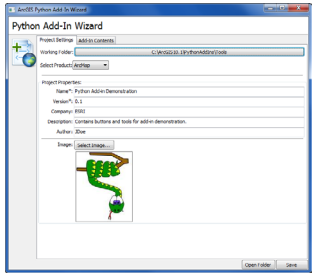
HOW TO OBTAIN DESCRIPTIVE INFORMATION ABOUT DATA
Describe function - ArcPy Functions
FeatureClass properties - ArcPy Functions
Get Raster Properties
Get Layer properties
Table properties - ArcPy Functions
Dataset properties
Workspace properties

USE GEOPROCESSIN G TO SELECT, EDIT AND ADD DATA TO EXISTING TABLES AND LAYERS
Introduction
Cursor object functions
InsertCursor
SearchCursor
UpdateCursor
Geometry Objects

OTHER ARCPY ELEMENTS
SpatialReference
Extend
FieldMappings, FieldInfo, FieldMap
Point, Polyline, Polygon
Array

ACCESSING LICENSES AND EXTENSIONS
Introduction
Licenses for ArcGIS products: Desktop, Engine, Server
Extension Licensing

GEOPROCESSING REPORTS
Using geoprocessing options to control tool execution
Viewing script tools execution history
Using the Results window
History log files
Viewing metadata



CREATING TOOLS WITH PYTHON SCRIPTING
Scripting: Your First Steps to create a tool
Understanding messages in script tools
Writing messages in script tools
Progressor in script tools
SetProgressor

DEVELOP ADD-INS FOR ARCGIS DESKTOP WITH PYTHON
Introduction to Add-In
Creating a Python Add-In tool
Share and install Add-Ins
Editing Add-Ins
Python Miscellaneous Topics

CREATE GRAPHICS WITH ARCPY
Introduction.
Graph
Graph proprieties
Graph methods
Make Graph
GraphTemplate
Exporting a graph to a native format
Save Graph

CONVERT GEOJSON OBJECTS TO GEOMETRY
What is the GeoJSON format?
GeoJSON code example
Converting geometries between GeoJSON and ArcPy objects

ADVANCED TOOLS
Introduction
FieldMappings processes
Proprieties and methods of FieldMappings object
The FieldMappings object
Working with multivalue inputs
Working with feature sets and record sets
Create and use RecordSet/FeatureSet objects
Create RecordSet/FeatureSet from input tools
How to get results from a geoprocessing server tool

USING CUSTOM TOOLBOXES
Importance of custom geoprocessing tools
Use a custom geoprocessing tool
ArcGIS Server toolboxes
Geoprocessing tasks with Python scripts

MANAGE ARCSDE GEODATABASES WITH PYTHON
Introduction
Validate table names
Validate field names
How to parse table and field names
Using SQL with ArcSDE
Transactions with ArcSDESQLExecute
Workflow Transactions

INTRODUCTION TO RASTER ANALYSIS WITH SPATIAL ANALYST MODULE OF ARCPY
Introduction to Spatial Analyst module of ArcPy
Raster - ArcPy Classes
Working with Raster Objects - overview of Map Algebra
Raster Dataset properties
Raster Methods
An overview of Spatial Analyst classes

PART IV ARCGIS ARCOBJECTS AND VISUAL STUDIO

INTRODUCTION TO ARCOBJECTS. ARCGIS EXTENSION
History of ESRI Programming Languages
Advantages and disadvantages
ArcGIS framework customization
Exercise: Adding a zoom button in ArcGIS

BASIC PROGRAMMING PRINCIPLES
GIS data access and manipulation with Python, add layers, edit proprieties and table attributes
How we do declare the variables
Constants
Enumerations
Declaring variables and constants
Expressions
Operators
Programming Statements
Putting comments in code
Matrices
Code reuse
Functions
Classes and Modules
Variables scope
Forms
Control proprieties: Control-textbox, ComboBox
Exercise: Adding a description to a form field, create a toolbar, modifying field properties, set proprieties for a field.
Object oriented programming
Programming style

PROGRAM

OBJECT-ORIENTED PROGRAMMING PRINCIPLES

Create a new instance of an object
Interfaces
Object hierarchy
Collections of objects
Access Members of an Object
Objects in ArcGIS
Declare an object
Explicit conversions
Object model diagrams (OMD)
Exercise: Creating object model diagrams

WORKING WITH MAP DOCUMENTS

Application and document objects
Hiding or displaying the status bar
Progress bar
Setting map document properties
ActiveView
Output parameters
Map
Graphic elements
Adding a marker element to the map
ArcObjects colors
Code modulation

WORKING WITH LAYERS

ArcObjects Object Model
ILayer
iFeatureLayer2
Accessing Feature Layers
Working with enumerations
Types of Operators
Working with group layers
ArcObjects data model
IFeatureClass
Cursors
Resource Management
IFeature
Boards
Access classes
Get Field Value
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Create a new custom field from scratch
Exercises: Add graphics to layers; Add XY data to a polygon.

WORKING WITH GEOMETRIES

IGeometry
Point
IPoint Interface
Creating a point feature
How to Create AWARE points?
ArcObjects Geometry Object Model
Interfaces: IPath, IPolyline6, IPointCollection4, IGeometryCollection, IRing, IPolygon4, IPolycurve2
Access feature geometries and graphic elements
IFeature.Shape vs. IFeature.ShapeCopy
Spatial reference: ISpatialReferenceFactory Interface
Exercise: Building a geometric structure

WORKING FWITH GEOMETRIC OPERATIONS

Introduction
What is a geometry operation?
IArea Interface
Other types of operators
Topological operators
ITopologicalOperator Interface
IRelationalOperator2
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Exercise: Creating a buffer around a feature, sum of areas

INTERROGATIONS (QUERIES) AND SELECTIONS

IQueryFilter
SQL examples
SQL questions
ISQLSyntax interface
Other resources
ISpatialQuery
What can you do with a Query Filter?
ISpatialQuery example
Working with Selections
IFeatureSelection
ISelectionSet

OBTAIN ACCESS TO THE DATA

The architecture of a geodatabase
File Geodatabase in ArcObjects
IFeatureWorkspace interface
IDataset interface
IFeatureClassContainer interface
Dataset Objects
Dynamic layers, dynamic workspaces
IWorkspaceFactory Interface
Types of workspace factories
Working with shapefiles
Opening a feature class in a geodatabase
Add a feature class to a map
Exercise: How to access local data?

WORKING WITH RASTERS

The raster data model
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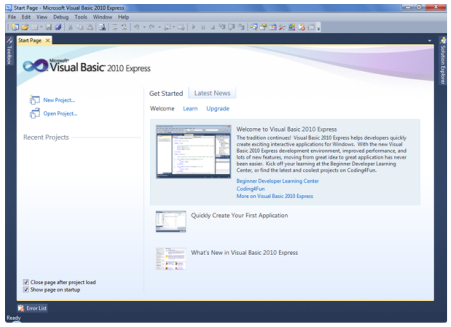
IRasterProps interface
IRaster interface
IRaster2 interface
IRasterEdit interface
IPixelBlocks interface
IRasterBandCollection interface
IRasterDataset2 interface
IRasterWorkspace2 interface
Raster Access
Reading & Writing Cell Values
Exercise: Obtain an elevation profile over a predefined line

OTHER APPLICATIONS AND USEFUL TOOLS

ArcObjects Geoprocessing
How to use the Geoprocessor
Geoprocessor examples
Working with time-aware layers
Software products life cycles



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