QGIS

VECTORIAL QGIS CURSE

INEGI

Objective

The participant will learn to use vector data to query, validate analyze and automate vector information using QGIS tools to generate geographic information.

Admission profile

- Notions of Geographic Information Systems (basic knowledge of QGIS)
- Basic concepts of cartography
- Skills in managing computer systems.

Graduation profile

The participant will learn:

- Basic concepts and characteristics to generate atlases from print composition.
- To identify statistical and graphic techniques to analyze geographic data.
- Techniques to manipulate vector data to validate and correct topology.

Modality

Mixed (live sessions through the Microsoft TEAMS platform and the online SICAP platform of INEGI).

Materials

The materials consist of a user manual in digital format (pdf), worksheets and exercises for each of the topics that conforms the course. These materials will be provided to participants through the SICAP distance training platform of the National Institute of Geography (INEGI)

Methodology

The SICAP distance training platform will be used. This platform has all the topics of the Basic QGIS course, as well as the exercises and worksheets which must be downloaded by the participants to work with the exercises. These practical exercises will be replicated by the instructors in the live sessions with the purpose that the participants perform them alongside the instructors to provide explanations and demonstrations of procedures to be carried out. To practice the procedures, participants will provide evidence through the worksheets that are requested for each topic of the course. These worksheets will be reviewed and given feedback by the assigned instructor. These tasks are mandatory.

The mechanism for raising doubts is through the live session or by email. The grade will be obtained from the result of a final exam. In order to gain access to the final exam the participant must upload all the worksheets on the SICAP platform. It is recommended that the participant, before enrolling in the other QGis courses offered by INEGI, first enroll in the Basic QGIS. The participant must have 80% attendance as mandatory.

Topics

1. INTRODUCTION

Objective: The participant will identify what QGIS is, its installation and what programs the QGIS installation includes.

Subtopics:

1. Definition of QGIS
2. QGIS installation
3. Programs included in the QGIS installation.

2. GENERATING AN ATLAS WITH QGIS

Objective: The participant will learn how to use the Atlas options with QGIS for the automatic generation of several maps with a common format.

Subtopic:

1. Generation of print composition
2. Page settings
3. Generate an Atlas

4. Adjust scale
5. Add more elements to the composition.
6. Export composition

3. STATISTICS FOR SPATIAL DATA

Objective: The participant will identify the spatial statistical tools Zone Statistics and Point Sampling Tool with the purpose that the spatial information is analyzed statistically like any other information.

Subtopic:

1. Installing the Point Sampling Tool plugin
2. Use the Point Sampling Tool plugin.
3. Use zone statistics
4. Checking result using the spatial object identifier
5. Style the layers with the new generated data
6. Analyze the data in the Histogram tab.
7. Application of drawing effects.

4. GENERATING GRAPHICS WITH DATA PLOTLY

Objective: The participantwill use the functionalities of the Data Plotly plugin to create different types of diagrams linked to the vector layers inserted in the map canvas (canvas).

Subtopic:

1. Chart types
2. Install Data Plotly plugins
3. Use Data Plotly (Data Plotly Dialog Settings)

5. HOW TO PACKAGE MAPS IN QGIS?

Objective: The participant will use the QConsolidate3 plugin, which makes it easy to share the map document and data.

Subtopic:

1. Plugin Dialog Setting (Also show experimental plugins)
2. Installing Qconsolidate3 plugin

3. Start of the packaging process

6. CREATION OF COLOR MAP (HEATMAP)

Objective: The participant will learn the tools necessary to create a heatmap to represent the density of points in each area on the map.

Subtopic:

1. Definition of the heat map
2. Add Delimited Text Layer
3. Setting layer properties
4. Interpolation (Heat Map)
5. Use the raster calculator
6. Polygonise (raster to vector)
7. Setting layer properties, Source section
8. Query Builder

7. DISTANCE MATRIX

Objective: The participant will use analysis tools called distance matrix with the purpose of measuring the distance between two points on the layer.

Subtopic

1. Definition of the distance matrix
2. Add Delimited Text Layer
3. Delimited Text Dialog Box Settings
4. Change layer symbology
5. Use analysis tools (distance matrix)
6. Distance Matrix Dialog Box Settings
7. Performing layer join (Add Vector Join dialog box settings)
8. Query Builder Dialog Settings
9. Definition of MQGIS
10. Installation of mmqgis plugin
11. Use Hub Lines/Distance
12. Hub/LinesDistance Dialog Box Configuration

8. BATCH PROCESSING USING PROCESSING FRAMEWORK

Objective: The participant will employ the Processing Framework to perform algorithm execution to execute native and third-party algorithms for data processing.

Subtopic:

1. Definition of processing framework
2. Processing framework content
3. Definition of batch processing
4. Use geoprocessing tools (Dissolve)
5. Dissolve Dialog Box Settings
6. Use the toolbox (GDAL | Vector Geoprocessing | Cut Vector by Mask Layer)
7. Batch processing dialog box settings (vector cut by mask layer)
8. Autofill Settings Dialog Settings

9. TOPOLOGY

Objective: The participant will apply topology to detect and correct errors in spatial data.

Subtopics:

1. Topology creation
2. Use of satellite image
3. Self-assembly options
4. Project self-assembly menu settings
5. Use the add polygon tool
6. Calculation of the field called area and the field called perimeter of the proposed area.
7. Editing topological elements (vertex tools)
8. Use the simplified spatial object tool
9. Use the add ring tool
10. Use the Ring Erase Tool
11. Use the add part tool
12. Use reshape object tool
13. Use tools to divide spatial objects
14. Use the tool to combine selected spatial objects
15. Setting the Combine Object Attributes Dialog Box

16. Validate and correct the topology (installation of the geometry checker plugin)
17. Configure the topology check dialog box
18. Configure Topology Rules Configuration Dialog
19. Use the Move Objects Tool
20. Settings Topology Rules Settings Dialog Box (apple polygons do not overlap each other)

9.1 Topology rules validate and correct the topology

Objective: The participant will use the Topology Checker plugin allowing you to identify topological errors that did not comply with the configured rules.

Subtopics:

1. Types of topology errors
2. Topology rules
3. Validate and correct the topology

10. ANIMATION AND THEMATIC REPRESENTATION OF PATHS

Objective: The participant will use the MMQGIS animated line tools to facilitate the animation of lines that grow to their full length for the specified duration of the animation. Allowing the creation of simple map animations as consequences of map image PNG files

Subtopics:

a. Export maps to image
b. Dialog box settings, save map as image.
c. Animate Lines Tool

11. SQLite database and POINT SAMPLING TOOL

Objective: The participant will obtain vector information inputs using the SQLite database, with the purpose of extracting the values from a raster image to a vector layer using the Point Sampling Tool behavior.

Subtopics:

d. Creating a Geopackage connection
e. Obtaining inputs through the official INEGI website
f. Reprojection of layers
g. Query Builder

Duration 20 hours.

An effective workshop time of 20 hours has been considered. 10 sessions of 2 hours are recommended.

Maximum group capacity

- 25 people.

Schedule:

- Group 1: from 8:30 to 10:30, Mexico time.
- Group 2: from 12:00 to 2:00 p.m., Mexico time.
- August 5 to 19,2024. August 15 non-working day.
- Last day for registration March 29,2024.

Technical requirements

To give the workshop, it is necessary that each participant has a computer with internet access and the following minimum characteristics:

RAM memory	8Gb
Processor	Intel i5 processor or equivalent
HDD	20GB free hard drive
Browser	Browser Latest versions of Chrome and Mozilla Firefox
Accessories	Headband with microphone, camera not necessary

Pre-installed software

- QGIS version 3.28.6 LTR
- GIMP version 2.10
- Microsoft TEAMS

Contact:

For more information to the following emails:

- sandra.gomez@inegi.org.mx
- sergio.enriquez@inegi.org.mx