

Intro on Geographic Information Systems (GIS) Course

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The following material is for the following courses on Geographical Information Systems:

- **GIS for Agro-Environmental Studies** (4 CFU - Sustainable Agriculture)
- **Introduction to GIS** (2 CFU – Forest Science)

The **first half** (2 CFU – common between courses) will cover practical tutorials to familiarize with geographic information systems (GIS) and hands-on learning of a GIS software. Tutorials are found in <http://www.qgistutorials.com/en/> up to (not including) “Advanced GIS operations”.

The **second half** is more advanced and will cover specific challenges related to sustainable agriculture.

Guidelines for lectures

Please make sure that you **sign-up to the specific course in the E-learning platform** <https://elearning.unipd.it/scuolaamv/>. This allows students to upload material (including assignments and final project) and get announcements in your UNIPD mailbox.

Material

Hardware

For most of the course activities will use a PC, learning to use GIS tools. It is strongly recommended that you use your own PC / Laptop. If you do not have access to a PC/Laptop, please contact me - francesco.pirotti@unipd.it.

GIS Software

We will use an open-source software called QGIS. Please **download and install** the LTR version (Long Term Release) that you find in the QGIS Website - contact me if you have problems installing the software.

Other course material

Tutorials The tutorials are found in <http://www.qgistutorials.com/en/> up to (not including) “Advanced GIS operations”.

Handouts and datasets Reference to all material will be available in the course page in the **e-learning platform** <https://elearning.unipd.it/scuolaamv/> - as mentioned, make sure you have signed-up for the course **so that you get all announcements from teachers directly in your mailbox.**

Lecture LOG For each lecture you will find track of what was covered in the video that will be uploaded in the course playlist. The video description will hold information on the contents of the lecture, i.e. a log of what was covered in the classroom.

Remote participation

All lectures will be recorded in ZOOM and uploaded to a dedicated playlist in the media section. **Check the course page in Moodle E-Learning to get the link for the dedicated playlist for each course.**

Covid Safety

You are welcome to come to lectures physically, but specific indications will be given for each date/course depending on the situation. **Check course moodle elearning page for details.**

Rules

1. If you have any symptoms related to flu (temperature, cough, running nose), DO NOT participate physically - contact the professor to define means to access the course remotely.
2. If you are in any areas that cannot ensure social distancing, always wear mask.
3. Follow any directions from the university’s website regarding access modalities, which might change depending on the situation.

OrariUnipd APP

- Download in your smartphone the **OrariUnipd** APP.
- When taking a seat in a classroom, from the **OrariUnipd** APP select **Rileva Presenza** from the menu and scan the QRCode that will be projected by the teacher at the beginning of the lecture with your smartphone. Insert also the place of your seat.
- If you are NOT present, but are following online, use the XXX code in EasyBadge APP - this is an extra certification that you are NOT present physically (in case of positive person in the classroom, you will not be asked to test for Covid).

All the above will allow a very minimal impact in case any participant is positive to Covid.

In case of a positive test on a person, the APP will identify all who came in close contact over a time window, thus allow to test selectively only close .

Minimal terminology

You should be familiar with the following **minimal terminology** by the end of the course:

- Vector model
- Raster model
- DTM/DSM/DEM models
- The following **vector** format: ESRI shapefile, GeoPackage (check http://gdal.org/ogr_formats.html)
- The following **raster** formats: GeoTiff (check http://gdal.org/formats_list.html)
- Spatial data in TEXT files, structured and not structured.
- **Geodatabases**
 - PostgreSQL/PostGIS
 - ORACLE
- Online mapping services
 - Open Geospatial Consortium standards – WFS, WMS, WCS.
- Slope – aspect (derived from DTM processing)
- **Geo-processing** of vector datasets
 - Buffer procedure
 - Union, Merge, Clip
 - Spatial Join
 - Spatial operators to query vector elements
 - * Intersects, Overlaps, Within, Touches
- Operators to operate on **table data** of vector elements
 - Join/link tables using a common key field
 - Select with ILIKE / LIKE - Equal to / not equal to - Less than /greater than

- **Raster calculator**
- **Coordinate reference systems***
 - Projected
 - * UTM-WGS84 (EPSG 326xx) for Italy EPSG 32632 and 32633
 - * For Italy only: Gauss Boaga - Roma Monte Mario (EPSG 3003 or EPSG 3004)
 - Geographic (longitude and latitude angular coordinates)
 - * WGS84 (EPSG 4326)

*This course is not on Cartography therefore we will not spend too much time on coordinate reference systems – it should be noted that a basic knowledge of Cartography is an asset for several GIS applications.

Examination and grading

The GIS course is a **PASS/NO PASS** course – it is not graded¹.

The evaluation is carried out by:

- Homework assignments
- Lab project report

To pass the course you have to upload the PDFs of the above material to the e-learning platform².

Homework assignments consists in simple exercises using the GIS software; you will create thematic maps that can be exported to PDF using the GIS software.

The **lab project** consists in developing your idea for solving a problem / testing an hypothesis using GIS software. The following course material is useful for the project:

- **lab project MS Word template**
- **handout - access geodata** – a guide on how to access raster/vector datasets in the web - also available in PDF format here - 14 MB

To be evaluated you must register to one of the official exam dates in UniWEB (www.uniweb.unipd.it). If I see your name in the list in UniWEB I will go and check your homework and assess the lab project. If you get a “NO PASS” (non idoneo), you will get feedback for improvements and will be allowed a second chance to hand-in an improved version of homework/lab-project. If you pass, you will see “PASS” (idoneo) in UniWEB.

¹Except special cases like MedFOR students that will be graded with “Excellent”, “Very Good”, “Good”...

²Remember to register to the course. My courses are open, so you can see them without signing-in to the course, but you will not be able to upload material if you are not registered to the course!