

# BASIC OF GEOGRAPHICAL INFORMATION SYSTEM

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# What this presentation covers?

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- What is **geographic information**?
- Importance of GIS
- What are the existing types of GIS software available to you.
- Advantages and disadvantages of GIS
- Applications of GIS
- Assets mapping



# GIS Objectives

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- ❑ Identify principles and functional issues pertaining to physical geography applications of GIS.
  - ❑ Examine and review specific application areas where GIS is a useful tool.
  - ❑ Investigate techniques provided by GIS which have particular relevance to physical geography applications and problem solving.
  - ❑ Identify and address problem areas such as data sources, modelling, error and uncertainty.
  - ❑ The broad types of GIS software that are available.
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# Why it matters?

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Almost everything happens somewhere and in most cases, knowing where some things happen is critically important.

Examples:

- Position of country boundaries
  - Location of hospitals
  - Routing delivery vehicles
  - Management of forest stands
  - Disaster affected areas
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# Features of GIS

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- Multidimensional – at least two coordinates must be specified to define a location.
  - Voluminous – a geographic database can easily reach a terabyte in size.
  - Different Representations - and how this is done can strongly influence the ease of analysis and the end results.
  - Requires unique analysis methods.
  - Analyses require data integration.
  - Map displays require fast data retrieval.
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# Difference between GIS, GPS, RS

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GPS	RS	GIS
a system of earth-orbiting satellites which can provide precise (100 meter to sub-cm.)	use of satellites or aircraft to capture information about the earth's surface	Software systems with capability for input, storage, manipulation/analysis and output/display of geographic (spatial) information

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# Types of GIS

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There are a number of Geographical Information Systems (GIS) (or GIS software) available today. They range from high-powered analytical software to visual web applications, and each of those are used for a different purpose.

Although they share the common characteristics yet their functions are different. GIS are broadly classified into 3 types:-

- **Web-based GIS:** ONS
  - **Geobrowser:** Google Earth
  - **Desktop GIS:** QGIS
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# 1) Desktop GIS

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A GIS, or GIS software, allows you to interactively work with spatial data. A desktop GIS is a mapping software that needs to be installed onto and runs on a personal computer.

In the project I have made use of **QGIS Essen 2.14** which is developed by **ESRI**.

QGIS is what ESRI refer to as a suite of products which can be tailored to our need. QGIS is used for a vast range of activities, covering both commercial and educational uses.

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## 2) Geobrowser

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A Geobrowser is better explained with reference to an internet browser, i.e. Internet Explorer. In short, a geobrowser can be understood as an Internet Explorer for geographic information. Like the internet it allows the combination of many types of geographic data from many different sources. The biggest difference between the World Wide Web and the geographic web however is that everything within the latter is *spatially referenced*.

➤ **Google Earth** is the most popular geobrowser available and will be the one used for this course.

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## 3) Web-based GIS

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Web-based GIS, or WebGIS, are online GIS applications which in most cases are excellent data visualisation tools. Their functionality is limited compared to software stored on your computer, but they are user-friendly and particularly useful as they not required data download.

There are many WebGIS available, but commonly used are: the **Office of National Statistics (ONS)** and the **London Profiler**.

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# GIS Softwares

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There are a number of softwares available for GIS purpose.

Few of them are:-

- Grass Gis
  - Gvsig
  - Ilwis
  - Jump Gis
  - Map window Gis
  - Qgis
  - Saga Gis
  - ARCGIS
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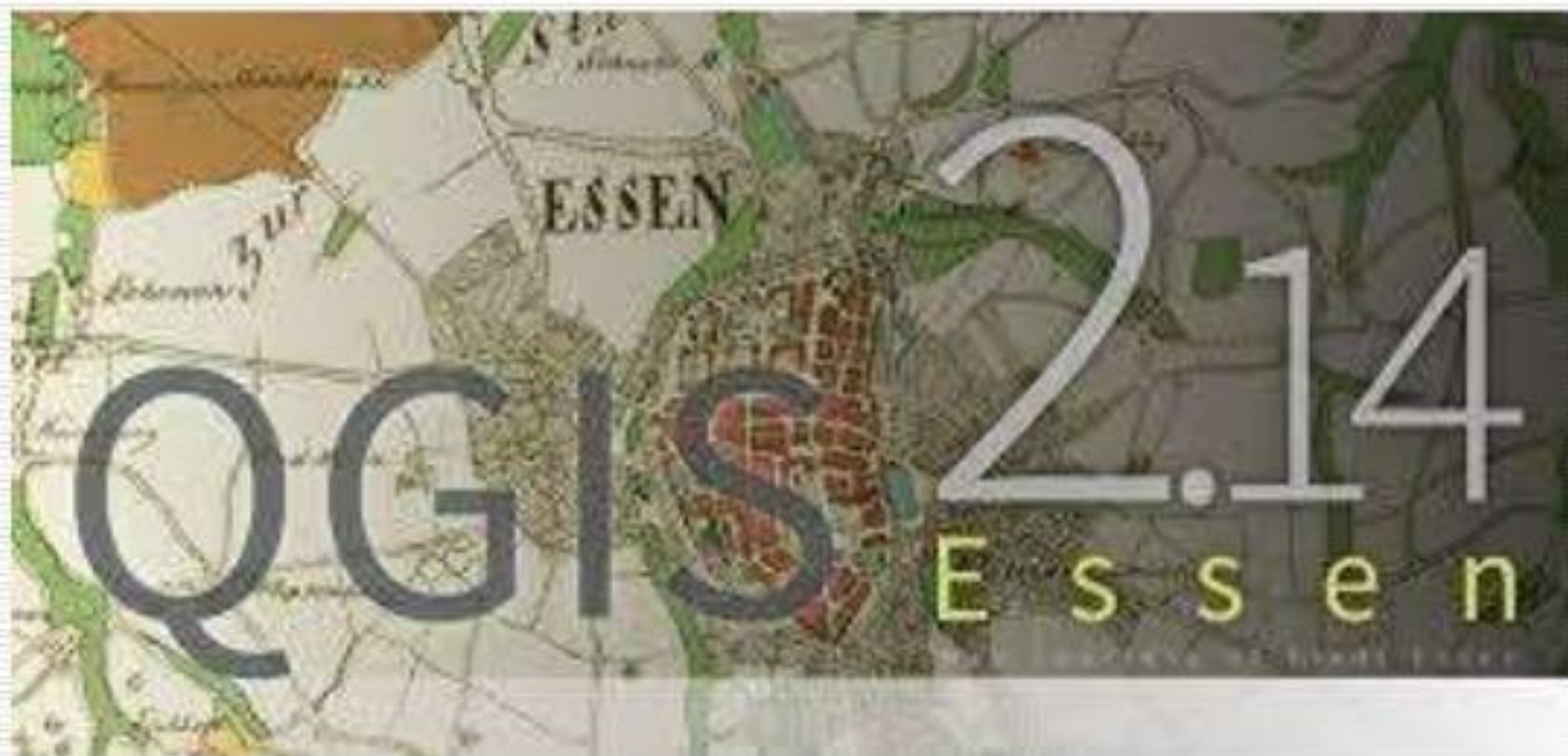
# QUANTUM GIS(QGIS)

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- ❑ **QGIS** is a cross-platform free and open-source desktop geographic information system (GIS) application that provides data viewing, editing, and analysis.
  - ❑ QGIS allows users to create maps with many layers using different [map projections](#). Maps can be assembled in different formats and for different uses. QGIS allows maps to be composed of **Raster** or **Vector** layers.
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# QGIS(cont.)

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# Types of Data

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## 1) Raster Data:-

- ❑ **Raster data** is made up of pixels (also referred to as grid cells). They are usually regularly-spaced and square but they don't have to be. Raster often look pixilated because each pixel is associated with a value or class.
  - ❑ Raster models are useful for storing data that varies continuously, as in an aerial photograph, an elevation surface or a satellite image. But it depends on the cell size for spatial accuracy.
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## 2) Vector Data:-

- ❑ Vector graphics are comprised of **vertices and paths**.
  - ❑ The three basic symbol types for vector data are points, lines and polygons (areas). In GIS terminology, real-world features are called **spatial entities**.
  - ❑ The decision to choose vector points, lines or polygons is governed by the cartographer and scale of the map.
  - ❑ **Vector points** are simply XY coordinates. When features are too small to be represented as polygons, points are used
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# QGIS Shapefiles

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- ❑ The standard vector file format used in QGIS is the ESRI Shapefile.
  - ❑ A shape file actually consists of several files. The following three are required:
    - .shp file containing the feature geometries.
    - .dbf file containing the attributes in dBase format.
    - .shx index file.
  - ❑ Shapefiles also can include a file with a .prj suffix, which contains the projection information. While it is very useful to have a projection file, it is not mandatory. A shapefile dataset can contain additional files.
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# Google Earth

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- ❑ Google Earth displays satellite images of varying resolution of the Earth's surface, allowing users to see things like cities and houses looking perpendicularly down or at an [oblique angle](#). The degree of resolution available is based somewhat on the points of interest and popularity, but most land is covered in at least 15 meters of resolution.
  - ❑ Google Earth supports managing three-dimensional [Geospatial](#) data.
  - It stores the data in .KML or .KMZ extension.
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# Difference between KML and KMZ file

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- ❑ KML stands for “Keyhole Markup Language” while KMZ stands for “Keyhole Markup Language Zipped.”
  - ❑ KML is used to save and store map locations in general while KMZ is used in the same capacity for more specific locations like placemarks.
  - ❑ KML can be read and recognized by many geobrowsers or programs that run maps and images like Google Earth and Google Maps. This sometimes does not hold true for KMZ.
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\* THANKING YOU FOR YOUR ANTICIPATION