**­­Definition of Geographic Information System (GIS):**

Geographic Information System is a powerful tool for handling spatial or georeferenced data. In a GIS, the data is maintained in a digital format. As such the data are in a form more physically compact than that of paper maps, tabulations or other conventional methods.

Like other fields of geography, the term Geographic Information System (GIS) is hard to define. It represents the integration of many subject areas. Accordingly, there is no absolutely agreed-upon definition of a GIS. *A broadly accepted definition of GIS is defined as a computer-based system that provides the following four sets of capabilities to handle georeferenced data:*

1. *Data capturing and preparation,*
2. *Data management (storage and maintenance),*
3. *Data manipulation and analysis, and*
4. *Data presentation.*

*According to the National Centre of Geographic Information and Analysis, GIS is a system of hardware, software and procedures to facilitate the management, manipulation, analysis, modeling, representation and display of georeferenced data to solve complex problems regarding planning and management of resources (NCGIA, 1990).* Geographic information systems have emerged in the last decade as an essential tool for urban and resource planning and management. Their capacity to store, retrieve, analyze, model and map large areas with huge volumes of spatial data has led to an extraordinary proliferation of applications. Geographic information systems are now used for land use planning, utility management, ecosystems modeling, landscape assessment and planning, transportation and infrastructure planning, market analysis, visual impact analysis, facilities management, tax assessment, real estate analysis and many other applications.

**Basic Elements/Components of GIS**:

A working GIS integrates these five key components: hardware, software, data, people, and methods.

1. **Hardware**: Hardware is the Computer or Central Prcessing Unit (CPU) (Motherboard, Hard driver, processor, graphics card) and its peripherals such as Monitor, printer, plotter, scanner and mouse, etc. through which GIS software can run. The Computer or Central Processing Unit (CPU) is linked to the disk drive storage unit, which provides space for storing data and programs. The printer and plotter are used to present the results of the data processing and the scanner is used to data capturing and preparation. The user controls the computer and pheripherals (plotters, printers, and other apparatus linked to the computer) via a visual display unit (monitor). Nowadays there is a wide range of computer, it might be Desktop, Laptop or server-based. These all components function together to run GIS software smoothly.
2. **Software**: The next component of the GIS is the GIS software that provides tools to run and edit spatial data. The software package for a geographic information system consists of five basic modules. These basic modules are sub-systems for :
3. Data inputs and verification
4. Data storage and database management
5. Data output and presentation
6. Data transformation
7. Interaction with the users

It helps to query, edit, run and display GIS data. It uses RDBMS (Relational Database Management System) to store the data. Arc GIS, QGIS, Map Info and SAGA GIS are the widely used GIS software.

1. **Data**: The most important and expensive component of the Geographic Information System is Data which is generally known as fuel for GIS. GIS data is a combination of graphic and tabular data. Graphics can be vector or raster. Both types of data can be created in house using GIS software or can be purchased. The process of creating GIS data from the analog data or paper format is called digitization. Digitization process involves registering of raster image using a few GCP (ground control point) or known coordinates.  This process is widely known as rubber sheeting or georeferencing. Polygon, lines, and points are created by digitizing the raster image. Raster image itself can be registered with coordinates which are widely known as rectifying the image. Registered images are mostly exported in TIFF format. As mentioned above, GIS data can be Raster or Vector
2. **People**: People are the most important part and user of Geographic Information System. They define and develop the procedures used by a GIS. Hardware and software have been seen tremendous development which made people easy to used the GIS software. Also, nowadays the computers are affordable so people are using for GIS task. These tasks may be creating a simple map or performing advance GIS analysis. The people are the main component of successful GIS.
3. **Methods / Procedures**: The method is another important element of GIS. The methods/procedures used to input, analyze, and query data determine the quality and validity of the final product. The methods/procedures used are simply the steps taken in a well defined and consistent method to produce correct and reproducible results from the GIS system.

