Geographic Information System (GIS)

A Geographic Information System is a system of computer software, hardware and data, and the personnel that make it possible to enter, manipulate, analyze, and present information that is tied to a location on the earth's surface.

The components of a GIS are following:

- **Computer Hardware and Software**
- **Spatial Data from the "Real World"**
- **Trained Personnel**

Hardware/Software: Hardware is the computer on which a GIS operates. The software runs on a wide range of hardware types, from centralized computer servers to desktop computers used in stand-alone or networked configurations. GIS software provides functions and tools needed to input and store geographic information. It also provides query tools, performs analysis, and displays geographic information in the form of maps or reports. All GIS software packages rely on an underlying database management system (DBMS) for storage and management of the geographic and attribute data. The GIS communicates with the DBMS to perform queries specified by the user.

Data: Data is one of the most important, and often most expensive, components of a GIS. Geographic data, which is comprised of geographic features and their corresponding attribute information, is entered into a GIS using a technique called digitizing. This process involves digitally encoding geographic features, such as buildings, roads or county boundaries. Digitizing is done by tracing the location, path or boundary of geographic features either on a computer screen using a scanned map in the background, or a paper map that is attached to a digitizing tablet. The digitizing process can be very tedious and time consuming, especially when capturing large datasets such as soil polygons, streams or topographic contours. Fortunately, much of the data GIS users need has been created by government agencies or commercial operations, and is available for free or for purchase from the data provider or from a spatial data clearinghouse, such as PASDA.

People: The real power of a GIS comes from the people who use them. Over the past decade, computers have become much easier for people to use and more affordable for

companies, schools and organizations to purchase. Given this fact, the number of GIS users has increased rapidly, and no longer includes only GIS specialists. Today GIS is being used by people, in many different fields, as a tool that enables them to perform their jobs more effectively. Police use GIS to solve crimes, Emergency 911 operators use GIS to send emergency personnel to a person in distress, biologists use GIS to protect plant and animal species, teachers use GIS to teach lessons in geography, history or engineering. The list of GIS users in the 21st century goes on and on. Whatever the application, the user is the key to a successful GIS.