

## STUDY MATERIAL

### SEMESTER 5<sup>TH</sup>

#### PAPER- FUNDAMENTALS AND SURVEYING AND MAPPING

#### MODULE 1 : PRINCIPLES AND TECHNIQUE OF SURVEYING

## Surveying: Definition, Classification, Principles and Applications

**Surveying** is the scientific art of determining the relative positions of points on, above, or below the surface of the Earth by measuring distances, directions, and elevations. It also involves representing these features on maps or plans to a suitable scale. Surveying forms the basic foundation of geography, cartography, civil engineering, and planning.

### Classification of Surveying

Surveying can be classified on the basis of the extent of the area and the nature of the Earth's surface. **Plane surveying** is carried out over small areas where the curvature of the Earth is ignored, and the Earth's surface is assumed to be a plane. This type of surveying is commonly used for local mapping, engineering projects, and cadastral surveys. **Geodetic surveying**, on the other hand, is conducted over large areas where the curvature of the Earth is taken into account. It involves high-precision measurements and is used for national mapping, large-scale control networks, and scientific studies.

Surveying can also be classified based on purpose, such as **topographical surveying**, **cadastral surveying**, **engineering surveying**, and **hydrographic surveying**, each serving specific practical needs.

### Applications of Surveying

Surveying has wide applications in various fields. It is essential for the preparation of topographical maps, land records, and property boundaries. Surveying is also used in the planning and construction of roads, railways, canals, dams, and buildings. In geography, surveying helps in field data collection, landscape analysis, and map preparation. It also plays an important role in urban planning, environmental management, and resource assessment.

### Principles of Surveying: Plane and Geodetic Surveying

The fundamental principles of surveying are applicable to both plane and geodetic surveying. Plane surveying operates under the assumption that the Earth is flat, and thus all lines are considered straight and angles are plane angles. This principle is suitable for small-scale surveys where high precision is not required. Geodetic surveying, however, considers the Earth as a spheroid. It involves precise observations and mathematical corrections to account

for the Earth's curvature. This principle is essential for large-scale and highly accurate surveys.

Both types of surveying follow two basic principles: **working from whole to part**, and **fixing the position of a point by at least two independent measurements**. These principles help in minimizing errors and ensuring accuracy.

## **Bearing**

**Bearing** refers to the horizontal angle measured in a clockwise direction from a reference direction, usually the north. Bearings are used to express the direction of a survey line. There are two commonly used systems of bearing: **Whole Circle Bearing (WCB)**, measured from  $0^\circ$  to  $360^\circ$ , and **Quadrantal Bearing (QB)**, measured from  $0^\circ$  to  $90^\circ$  in each quadrant. Bearings are essential in traversing and mapping, as they help in determining the orientation of survey lines.

## **Triangulation**

**Triangulation** is a method of surveying in which the positions of points are determined by forming a network of interconnected triangles. In this method, at least one side of a triangle, known as the baseline, is measured accurately, and the remaining sides are calculated using measured angles. Triangulation is widely used in geodetic surveying for establishing control points over large areas. It ensures high accuracy and forms the basis for topographical and national mapping.

## **Conclusion**

In conclusion, surveying is a fundamental technique for measuring and mapping the Earth's surface. Its classification into plane and geodetic surveying, along with principles such as bearing and triangulation, provides a systematic framework for accurate data collection and representation. A sound understanding of surveying is essential for geographers, planners, and engineers.

## STUDY MATERIAL 2

### PAPER; ECONOMIC GEOGRAPHY

#### MODULE 1: BASICS OF ECONOMIC GEOGRAPHY

## Economic Geography: Meaning and Approaches

**Economic geography** is an important branch of human geography that deals with the study of economic activities and their spatial distribution across the Earth's surface. It examines how natural resources, human skills, capital, technology, and markets interact in different regions to produce goods and services. The main objective of economic geography is to understand the relationship between economic activities and geographical space.

### Meaning of Economic Geography

Economic geography focuses on the location, distribution, and organization of economic activities such as agriculture, mining, industry, trade, transport, and services. It studies how geographical factors like climate, relief, soil, and natural resources influence economic development, as well as how human factors such as population, culture, technology, and government policies affect economic decision-making. Thus, economic geography explains why certain economic activities are concentrated in specific regions while others are widely dispersed.

### Approaches to the Study of Economic Geography

Over time, several approaches have been developed to study economic geography. The **traditional descriptive approach** emphasizes the description of economic activities and their spatial patterns. It mainly focuses on regional studies and provides a factual account of production and distribution.

The **environmental determinism approach** highlights the influence of physical environment on economic activities. According to this view, natural conditions largely determine the type and level of economic development in a region. However, this approach was later criticized for underestimating human initiative.

The **possibilism approach** emerged as a response to environmental determinism. It argues that while the environment sets certain limits, humans have the ability to modify and utilize natural resources through technology and innovation. This approach gives greater importance to human choice and cultural factors in shaping economic activities.

The **regional approach** studies economic activities within specific regions to understand regional specialization and economic differences. It emphasizes the uniqueness of regions based on their resource base, economic structure, and level of development.

The **systematic or analytical approach** focuses on the study of individual economic activities on a global scale. It analyzes factors affecting location, production, and distribution

using models and theories. This approach has contributed to a more scientific understanding of economic geography.

The **quantitative and behavioral approaches**, developed in the mid-twentieth century, apply statistical methods and mathematical models to analyze economic patterns and human decision-making processes. These approaches aim to bring precision and objectivity to economic geographical studies.

## **Importance of Economic Geography**

Economic geography helps in understanding regional inequalities, resource utilization, and patterns of economic development. It provides valuable insights for planning, policy formulation, and sustainable development by identifying the spatial dimensions of economic activities.

## **Conclusion**

In conclusion, economic geography is a dynamic field that examines the spatial organization of economic activities. Through various approaches, it seeks to explain the complex interactions between geography and the economy. A comprehensive understanding of economic geography is essential for analyzing development patterns and addressing economic challenges at local, regional, and global levels.