### Title: Fundamentals of Geolocation and Geospatial Data

#### I. Introduction to Geolocation

A. Definition and Importance

1. Define geolocation and its significance in spatial data science

2. Discuss real-world applications of geolocation

#### II. Representing Earth on Maps

A. Basics of Cartography

1. Explain how the Earth is represented on maps

2. Introduce map projections and their impact on representation

3. Discuss the choice of map projections based on use case

B. Types of Maps

1. Overview of different types (topographic, thematic, choropleth, etc.)

2. Examples and use cases for each type of map

#### III. Geographic Coordinates

A. Longitude and Latitude

1. Define longitude and latitude

2. Explain their role in geolocation

3. Discuss how coordinates are used to pinpoint locations on Earth

B. Coordinate Reference Systems (CRS)

1. Introduction to CRS and its importance

2. Different types of CRS (e.g., geographic, projected)

3. Story behind popular CRS choices

#### IV. GPS Principles and Alternatives

A. Global Positioning System (GPS)

1. How GPS works

2. Applications of GPS in spatial data science

3. Advantages and limitations of GPS

B. Alternatives to GPS

1. Overview of alternative positioning systems (GLONASS, Galileo, BeiDou)

2. Discuss their global coverage and applications

#### V. Types of Geospatial Data

A. Vector Data

1. Definition and characteristics

2. Examples of vector data (points, lines, polygons)

3. Use cases for vector data in spatial analysis

B. Raster Data

1. Definition and characteristics

2. Examples of raster data (satellite imagery, elevation models)

3. Use cases for raster data in spatial analysis

#### VI. File Formats for Geospatial Data

A. Overview of Common Formats

1. Shapefile

2. GeoJSON

3. GeoTIFF

#### VII. Sources of Geospatial Data

A. Well-Known Platforms

1. OpenStreetMap

2. NASA Earth Observing System Data and Information System (EOSDIS)

3. US Geological Survey (USGS)

B. Lesser-Known Platforms

1. China National Earth System Science Data Center (NESSDC)

2. Bhuvan - Indian Geo-Platform

#### VIII. Conclusion

A. Summarize key concepts

B. Emphasize the importance of understanding geolocation fundamentals

C. Preview upcoming chapters and practical exercises