



**Darrang College
(Autonomous),
Tezpur-784001**

Syllabus for Certificate Course

**Course Name: Basic Concept of Geospatial
Technology**

Introducing of Add-On Courses

“Basic Concepts of Geospatial Technology”.

P.G. Department of Geography

Darrang College (Autonomous), Tezpur

AIM: Introducing Add-On Course (GIS, Remote Sensing and GPS)

Introduction: GIS is a discipline generating massive interest worldwide. It is an interdisciplinary area used by heterogeneous groups, what you find is that since mid-1950's GIS as a subject has evolved changes taking place in “theoretical framework, technological improvements and institutional involvement in organizational improvement and inclusive nature” in the GIS field. It has a capability of using large data sets, performing multiple geo-analytics and at the same time geo-visualizing it as per the requirement. But all this begins with georeferencing –tagging different locations.

Every decision that we take today is largely driven by location and has spatial connotation directly or indirectly. Geographic Information System (GIS) –a modern day spatial decision making system. GIS has come a long way from digital mapping to decision making, invoking simulations, creating networks, evolving models based on big geo- data analytics and all gearing for real time decision making with prediction capability. That is where lies the power of geospatial domain and of which Geographic Information System is an important part. The users of this technology have multiplied manifold from few specialists in Universities, space research centers, government departments, and industry to a lay man. The usefulness of GIS is driven today by many pull and push factors and the rapid changes taking place around natural ecosystem. To meet the ever increasing demand created by huge population on infrastructure development, rural and urban planning, safe neighborhoods, multiple transportation facilities, disaster readiness of the community, conservation of nature require a holistic approach with careful understanding of space, created geography and /or varied dimensions of geographical aspect of the earth. Availability of multiple datasets collected from ground platform, aerial platform and space platform have given a new meaning and understanding of the existing locations. Use of GIS capturing various layers of these data sets have definitely added value to the usefulness of the decisions taken by the respective experts of the varied fields.

Learning Outcome:

1. The Functionality and Operation of Geographic Information Systems (GIS).
2. Basic Geographical data and reference systems, cartography and cartographic methods, relevant to the needs and scope of physical planning.

3. Data structures, data models and geographic/ spatial analysis techniques that are used for examination and presentation of the plan base, plan presentation and impact analysis
4. Facilitation of Geographical data in a GIS, preparation for analysis or design purposes.
5. Basic design and editing work using GIS tools.
6. The use of 2D and 3D for presentation of plan base and results in an easily understandable manner.
7. Use of GIS functions for plan-oriented analysis of localization or consequences of plan implication.
8. To make use of acquired knowledge and skills solving a variety of tasks related to geographic analysis and physical planning.

Course details:

Theory part: 1hour*16 classes= 16 hours

Content:

Unit	Chapter	No.of Classes	Duration
1	Geographic Information System i. Basic concepts (definition, components, data sources, spatial data structures) ii. Datum and map projection (geographic and projected coordinate system) iii. Overlay analysis (raster and vector)	5	1 hour
2	Remote Sensing i. Principles of remote sensing (Electromagnetic radiation and spectrum) ii. Interaction of EMR with earth's surface iii. Interaction of EMR with atmosphere (scattering: Non-selective, Rayleigh, Mie, absorption, refraction) iv. Key elements of Image interpretation v. Spectral signatures	5	1 hour
3	Global Navigation Satellite System i. Overview of GNSS with special reference to NAVIC (formerly IRNSS-GAGAN) ii. Segments of GNSS (example GPS-Control, space, user) iii. Positioning with GNSS (point positioning and relative/differential positioning) iv. Errors in GNSS observation (Satellite, receiver, and signal propagation errors)	5	1 hour
4	Application of remote sensing, GIS, and GNSS		

	i. Integrated application of (water, agriculture, planning, etc.)	1	1 hour
--	---	---	--------

Practical part: 2 hour * 8 classes=16 hours

Content:

Unit	Chapter	No.of Classes	Duration
1	GIS i. Georeferencing, Projections, Digitize, map layout ii. Thematic representation of anyone socio-economic parameters of any region iii. Spatial interpolation (IDW/Krigging/Spline)	3	2 hour
2	Remote sensing (Landsat product) i. Land use/ Land cover mapping ii. Normalized Difference Vegetative Index (NDVI)	2	2 hour
3	GPS i. Surveying and mapping of an area/plot with physical/cultural features using GPS ii. DEM generation from GPS points and preparation of slope, aspect, contour maps.	2	2 hour
4	Overlay analysis i. Raster & vector-weighted overlay	1	2 hour

Compulsory Assignments:

After completing the courses, we will give an assignment plus there will be practical examination in getting One month Certificate on “**Basic Concepts of Geospatial Technology**”.

Eligibility criteria: Interested candidates should have basic knowledge on Geography, GIS, Remote Sensing, and Cartography.