SRI VENKATESWARA UNIVERSITY - TIRUPATI

SEMESTER IV

	Theory	Practical
9	Major 9 : Fundamentals of Remote Sensing and GIS	Visual Image Interpretation and GIS Data Management
10	Major 10 : Regional Geography of India	Map Projections
11	Major 11 : Surveying Techniques	Surveying

SEMESTER - IV
Major –9: Fundamentals of Remote Sensing and GIS

Course Objective

- To provide knowledge on history and evolution of Remote sensing.
- To provide knowledge on the platforms and sensors and instruments used for remote sensing.
- To understand the evolution of GIS.
- To explain the types of data collection with respect to time and terrain and Data base management and retrieving the data from different sources.

Course Outcomes

After the completion of the course, Students will be able to

- Develop knowledge on history and evolution of remote sensing.
- Understand knowledge on the platforms and sensors and instruments used for remote sensing UnderstandtheevolutionofGIS.
- Focusoncollection,analysing,interpretationandresentingthedata related to Earth.
- Differentiate the types of data collection with respect to time and terrain and Database management and retrieving the data from different sources

UNIT I

Introduction to Remote Sensing: History, Development and Principles Stages in Remote sensing Process. Stages in Remote Sensing Process.

Unit II

Energy Sources and Radiation Principles-Energy Interaction in the Atmosphere. Atmospheric Windows. Energy Interaction with Earth Surface features. Electromagnetic Spectrum. Spectral reflectance patterns of Earth surface features in different wavelength.

UNIT III

Characteristics of Indian Remote Sensing Satellites (I.R.S), LANDSAT, etc. Principles of Image Interpretation: Elements of Image Interpretation, Digital Image Processing. Applications in Land use Land Cover Mapping and Urbanisation.

UNITIV

GIS:DefinitionsandDevelopment–ComputerComponentsofGIS(HardwareandSoftware)–GeneralDataBaseconceptsofSpatialandNon-spatial data - Elements of Spatial data-Sources of Spatial data– DataqualityforGIS–ErrorsandErrorvariationsinGIS.

UNITV

GIS Data Management: Data Base Management Systems (DBMS) Data BaseModels.Datainputmethods–SpatialDatastructures:Rasterdataand Vectordata–Structures –GISDataAnalysis:SpatialmeasurementmethodsReclassification–Buffering–OverlayAnalysis.

References:

1. Lillisand T.M and Keifer R.W, (1994), Remote Sensing and Image Interpretation, Jhon Willey & sons, New York.
2. Rampall, K.K. (1999), hand book of Aerial Photography and Interpretation, Concept Publishing Co., New Delhi.

3. Sabins, F.F. Jr, (1987), Remote Sensing; Principles and Interpretation, W.h. Freeman & Co., New York.
4. Jenson R. Jhon, (2003), Remote Sensing of the Environment-An Earth Resource Perspective, Pearson Education Pvt. Ltd., Indian Branch, Patparganj, Delhi, India.
5. LRA Narayanan, Remote sensing and its Applications, (1999), Universities Press (India) Ltd., Hyderabad.
6. http://rst.gsfc.nasa.gov/Front/tofc.html.
7. http://earthobsevatory.nasa.gov/Library/RemoteSensing
8. AronoffS.GeographicInformationSystem:AManagementPerspective,DDLPublication,Ottawa.1989.
9. BurroughP.A.PrinciplesofGeographicInformationSystemsforLandResourceAssessment.OxfordUniversityPress,NewYork,1986.
10. FraserTaylorD.R.GeographicInformationSystem.PergamonPress,Oxford, 1991.
11. MaquireD.J.M.F.GoodchildandD.W.Rhind(eds.)GeographicInformationSystems:PrinciplesandApplication.Taylor&Francis,Washington,1991.
12. MarkS.Monmonier.Computer–assistedCartography.Prentice–Hall,EnglewoodCliff,NewJersey,1982.
13. PeuquetD.J.andD.F.Marble,IntroductoryReadinginGeographicInformationSystems.Taylor&Francis,Washington,1990.
14. StarJ.AndJEstes. Geographic Information Systems : An Introduction. Prentice Hall, Englewood, Cliff, NewJersey,1994.

SEMESTER - IV

Major –10: Regional Geography of India

Course objectives:

- To conceptualize the regional approaches and to examine regional differentiation in the study of Indian Geography.
- To expose to historical, economic, cultural, social and physical characteristics of India.
- To provide an introduction to the regions of the India in terms of both their uniqueness and similarities. .

Course Outcomes

After the completion of the course, Students will be able to

- Developed the art of regionalization technique while focusing about diversity of Indian region.
- Visualized and recognized about regional identities and socio-cultural dimension of regionalization to address the issues and concern needed for regional planning.

UNIT – I:

Major Physiographic divisions. Himalayas, Great Plains, Plateaus, Coastal Plains and islands

UNIT - II

Major and Minor River Systems and their drainage pattern. Climate: Temperature and Rainfall. Trewartha's Climatic Regions of India.

UNIT-III:

Soils: Types, Characteristics and Distribution. Forest types and distribution and economic significance. Agriculture: Irrigation and Power projects. Major Food grain crops: Rice and Wheat. Major commercial Crops: Sugarcane and Cotton. Plantation Crops: Coffee and Tea. Animal Husbandry

UNIT-IV:

Mineral Resources: Coal, Iron ore, Petroleum and Natural gas. Locational pattern of Industrial Activity. Weber's theory of industrial location. Major Industries: Iron and Steel, Cotton textiles and Ship Building. Industrial Regions of India and their characteristics.

UNIT-V:

Population: Distribution, Density, Growth and problems. Urban and Rural Population – Distribution and Trends. Development and patterns of Transport Networks (railways, waterways, airways and pipelines).

References:

1. Spate, O.H.K. and Learmonth, A.T.A. (1972): India and Pakistan, B.I. Publication, Madras.
2. Sharma and Coutino (1980): Economic and Commercial Geography of India, Vikas Publications, New Delhi.
3. Singh, R.L. (1976): Regional Geography of India, National Geographical Society of India, Banaras.
4. Memoria, C.B. (1970): India's Population Problems, KitabMahal, Allahabad.
5. Wadia, D.N. (1961): Geography of India, Mc.Millan, London.
6. Tirtha, Geography of India, 2nd Edition
7. Chaudhuri, Development Regional Planning

SEMESTER - IV

Major –11: Surveying Techniques

Course Objectives

- Apply the knowledge, techniques, skills and modern tools of Surveying,
- To study the temporary adjustment of survey instruments by standard methods.
- To carry out topographic survey.

Course Outcomes

- Carry out temporary adjustment of survey instruments by standard methods ,levelling and cross sectioning survey and setting out works
- Carry out topographic survey

UNIT I:

Introduction to Surveying- Classification and Principles of Surveying, Geodetic and Plane (Topographic) Surveying, Surveying Instruments.

UNIT II:

Geometry of Ellipsoid: Everest and WGS 84, Latitude and Longitude, Co-ordinate System

UNIT III:

Leveling: Concept and principles of levelling, Mean Sea Level, different types of levelling, their application, Source of error in Levelling (instrumental, natural, and personal) and elimination of errors.

UNIT IV:

Traversing: Traverse angle, Observation of Traverse Length, Selection of Traverse Station, Traverse Field Notes, Traverse adjustment, rectangular co-ordinates.

UNIT V:

Cadastral map preparation methodology, unique identification number of parcel, position of existing control points and its types, adjacent boundaries and features, Topology Creation and verification. Scale of Cadastral map,

References:

1. Surveying Vol I & II, III B C Purnima, Laxmi Publication.
2. Surveying, volume 1&2 BY S.K.Duggal, TMH publisher.
3. Surveying & Levelling by T.P Kanitkar& V S Kulkarni

SEMESTER – IV

Major 9-Practical - Visual Image Interpretation and GIS Data Management

Course objectives:

- To explain practical knowledge on Remote sensing applications.
- To help to understand Visual and digital interpretation of satellite Images.
- To illustrate interpretation of Aerial photos.
- To acquaint knowledge on allocation of RS in different fields and sectors.

Course Outcomes:

After the completion of the course, Students will be able to

- Explain practical knowledge on Remote sensing applications.
- Understand Visual and digital interpretation of satellite Images.
- Illustrate interpretation of Aerial photos.
- Acquaint knowledge on allocation of RS in different fields and sectors.

Ex: 1 Techniques of Visual Interpretation.

Ex: 2 Marginal Information of Satellite Imageries.

Ex: 3 Visual Interpretation of Water Resources and

Lineaments, Ex: 4 Visual Interpretation of Landforms–Waste

Land

Ex: 5 Visual Interpretation of Land use / Land cover and change detection

References:

1. Curran,Paul,J.:Principles ofRemoteSensing:Longman,London,1985.
2. GautamN.C.etal.SpaceTechnologyandGeography; NationalRemoteSensingAgency,Hyderabad,1994.
3. ThomasM.Lillesandand Ralph, W.Keffer; Remote Sensing and imagesinterpretation, JohnWilley&Sons, NewYork,1994.

SEMESTER – IV

Major 10-Practical – Map Projections

Course Objective

- To apprise the students about the art and science of map making and representation.
- To explains the usage of different types of projections.
- To focus on the importance of scale and projection in the process of representing the earth surface.

Course Outcomes:

After the completion of the course, Students will be able to

- Explain the concept of map, scale and projection.
- Student can explain the purpose of projection.
- The main outcome of this course is students can able to select different projection for different geographical areas.

Ex: 1 Maps and scales-types, Conversion of Scales,Introduction to Map projections; Choice of Map Projection and UTM.

Ex: 2 Conical Projections: One Standard Parallel, Two Standard Parallel; Bonne's and Polyconic

Ex: 3 ZenithalPolar Projections: Stereographic and Gnomonic

Ex: 4 Cylindrical Projections: Equi -Distant, Equal Area and Mercator,

Ex: 5 International map projection: Sinusoidal andMollweideprojection.

References:

1. Khan, Z.A.: Text bookof practical geography: concept; New Delhi, 1998.
2. Misra, R.P. and Ramesh, A.: Fundamentals of Cartography, Concept, New Delhi,1989.
3. Singh, R.L.: Map work and practical geography; central book depot; Allahabad, 1972.
4. Steers, J.A.: Map projections, University of London Press,London.

SEMESTER – IV

Major 11-Practical – Surveying

Course objectives:

- To impart knowledge and practical skill in handling various tools of classical Surveying
- To understand various measuring and ranging methods for mapping linear, Angular and elevation Units

Course Outcomes:

On completion of the course the students are able to

- Describe various surveying concepts, methods, tools and its applications.
- Handle tools, perform survey and map them on the 2-dimensional sheets.
- Acquire spatial data and portray them on the maps with appropriate sketches
- Measure linear, angular and elevation details using modern instruments
- Import the acquired data into the GIS systems and perform digital analysis

Ex. 1: Chain Surveying and Triangulation

Ex. 2: Measurement of Bearings and Angles using Prismatic Compass

Ex. 3: Plane Table Surveying

Ex. 4: Dumpy Level Survey

Ex. 5: Preparation of Field

Map

References:

1. Punmia, B.C., Ashok, J.K. and Arun, K.J. (2005) Surveying-1, Vol. 1, Laxmi Publications, New Delhi.
2. Rampal, K.K (2011) Surveying, PragatiPrakashan, Meerut.
3. Ghilani, C.D. and Wolf, P.R. (2012) Elementary Surveying: An Introduction to
4. Geomatics, 13th ed., Pearson Education, Inc., New Jersey.
5. Wells, D.E., et al. (1986) Guide to GPS Positioning, Canadian GPS Associates, Canada
6. L. R. Singh (2010) Fundamentals Of Practical Geography, sharda pustak bhawan.