

UNIVERSITY OF KERALA

M.Sc. GEOGRAPHY

OUTCOME BASED SYLLABUS
(2022 Admission Onwards)

UNIVERSITY OF KERALA
M.Sc. GEOGRAPHY SYLLABUS
(OUTCOME BASED)

The '*Master of Science in Geography*' aims at empowering students with knowledge and skills for spatial thinking and analysis, to navigate real world problems, and contribute to society in a meaningful way. At the end of the Two-year (Four-Semester) course, students will have comprehensive knowledge about contemporary issues in Geography, both physical and human dimensions. It is designed to cover both traditional and contemporary framework of study, thus giving a wide scope to the learners to apply their knowledge and skills in real scenarios. The syllabus has been carefully designed to include conceptual, practical, experimental and skill building component.

Programme Objectives:

1. To orient the students towards identification and analysis of various facets of geographic and geographical features and processes
2. To develop students' aptitude for acquiring basic skills of carrying out field work
3. To facilitate the students to learn skills of map making
4. To guide students to learn the science and art of collecting, processing and interpreting the data
5. To expose the students to the use of the updated technologies of Remote sensing, GNSS, Geographical Information System (GIS)

Programme Outcomes:

1. Fostering the ability of the students to encounter practical problems with theoretical knowledge in Geography and Environment
2. Promotion of research aptitude and field work aptitude as well as laboratory based practical works for the students of Geography
3. Capacity enhancement of the students in spatial mapping on digital platform for the Geographical research and studies
4. Orientation of the students Understand various concepts and theories in the field of geographical enquiry
5. Explore real world issues through various research tools of geographical research

UNIVERSITY OF KERALA
GENERAL STRUCTURE OF M.Sc. GEOGRAPHY (SEMESTER)

Paper Code	Title of the Paper	Instructional Hrs/Week		Duration of ESA (Hrs)	Maximum Scores		
		L	P		CA	ESA	Total
SEMESTER I							
GO 511	Principles of Geomorphology	6	--	3	25	75	100
GO 512	Advanced Climatology	6	--	3	25	75	100
GO 513 A	Hydrology and Oceanography	6	--	3	25	75	100
GO 513 B	Principles of Geodesy	6	--	3	25	75	100
GO 514	Practical I: Physical Geography	--	7	3	25	75	100
SEMESTER II							
GO 521	Concepts and Trends in Geography	6	--	3	25	75	100
GO 522	Theoretical Economic Geography	6	--	3	25	75	100
GO 523 A	Regional Geography of India	6	--	3	25	75	100
GO 523 B	Political Geography	6	--	3	25	75	100
GO 524	Practical II: Quantitative Techniques & Surveying	--	7	3	25	75	100
SEMESTER III							
GO 531	Geography of Tourism	6		3	25	75	100
GO 532	Principles of Remote Sensing	6		3	25	75	100
GO 533 A	Research Methodology in Geography	6		3	25	75	100
GO 533 B	Geography of Health	6		3	25	75	100
GO 534	Practical III: Remote Sensing	--	7	3	25	75	100
SEMESTER IV							
GO 541	Environmental Management	6		3	25	75	100
GO 542	Urban & Regional Planning	6		3	25	75	100
GO 543 A	Geographic Information System	6		3	25	75	100
GO 543 B	Global Positioning System	6		3	25	75	100
GO 544	Practical IV: Geographic Information System	--	7	3	25	75	100
GO 545	Dissertation						100
GO 546	Comprehensive & Dissertation Viva-Voce						100

L-Lecture, P-Practical, CA-Continuous Assessment, ESA-End Semester Assessment

General Instructions:

1. Out of 100 scores earmarked for dissertation **20 scores** will be set apart for **viva-voce** examination based on the dissertation.

2. Examination for **Practical I & II** will be conducted at the *end of 2nd Semester* and **Practical III & IV** will be conducted at the *end of 4th Semester*.

CRITERIA FOR CONTINUOUS ASSESSMENT

Theory

Criteria	Marks
Attendance	>90% - 5 Marks
	>85 % - 4 Marks
	>80% - 3 Marks
	>75% - 2 Marks
	75% - 1 Mark
Test Papers (2)	5x2 = 10 Marks
Seminar	5 Marks
Assignment	5 Marks
Total	25 Marks

Practical

Criteria	Marks
Attendance	>90% - 5 Marks
	>85 % - 4 Marks
	>80% - 3 Marks
	>75% - 2 Marks
	75% - 1 Mark
Test Papers (2)	5 x 2 = 10 Marks
Punctuality	5 Marks
Legibility & Neatness	5 Marks
Total	25 Marks

DISTRIBUTION OF MARKS IN PRACTICAL EXAMINATION

Practical Paper	ESA Marks	Submissions	Total Marks
I	75	-	75
II	65	Field Work Report – 10 Marks	75
III	75	-	75
IV	50	Field Work/Study Tour Report - 25	75

GO 511 : PRINCIPLES OF GEOMORPHOLOGY

Course Outcomes:

- Understanding the basic concepts of Geomorphology
- Analysing River basins on the basis of Morphometric Analysis
- Understands the linkages between river channel form and processes
- Critically evaluates landform evolution and slope development
- Acquires knowledge about influence of climate on landform development
- Apply Geomorphic knowledge in various fields

UNIT - I

Development of Geomorphic Thoughts – Basic Concepts in Geomorphology – Recent trends in Geomorphology

UNIT - II

Geomorphic Processes and forms: Fluvial Geomorphic system: Morphometry of drainage basins, Drainage system and pattern, Channel Morphology, Channel Pattern – Glacial Landscapes – Glacial Ages - Aeolian Landscapes: Desertification – Coastal Geomorphology: Classification of Coasts, Coastal Processes and forms, Waves and current processes, Beach Profile, Coastal dunes, Estuaries, Tidal Flats, Deltas, Beach Erosion, Sea level Changes – Karst Landforms: Processes, Surface forms, Subterranean forms, Human impact on Karst region

UNIT - III

Landform Evolution: views of Davis, Penck, King – Hack's Dynamic Equilibrium Concept – Arid Cycle – Slopes: Basic Characteristics, Ideas of Wood, Concepts of Slope Decline, Slope Replacement and Parallel Retreat of Slopes

UNIT - IV

Erosion Surfaces and their interpretations – Climatic Geomorphology and Morphogenetic Region

UNIT - V

Applied Geomorphology with reference to Landscape Analysis, Hydrologic studies, Coastal Dynamics and Disease Ecology

References:

1. Chorley R J: Spatial Analysis in Geomorphology, Methuen, London, 1972.
2. Dury G H: The Face of the Earth, Penguin Harmondsworth, 1959.
3. Fairbridge R W: Encyclopaedia of Geomorphology, Reinholdts, New York, 1968.
4. Goudie A: The nature of Environment, Oxford and Blackwell, London, 1993.
5. Mitchell C W: Terrain Evaluation, Longman, London, 1973.
6. Oliver C D: Weathering, Longman, London, 1979.
7. Pitty A F: Introduction to Geomorphology, Methuen, London, 1971.
8. Stoddart D R (ed.): Processes and Forms in Geomorphology, Routledge, New York 1996.
9. Skinner B J & Porter S C: The Dynamic Earth, John Wiley, New York, 1995.
10. Sparks B W: Geomorphology, Longman, London, 1960.
11. Sharma H S (ed.): Perspectives in Geomorphology, Concept, New Delhi 1980.
12. Singh S: Geomorphology, Prayag Publication, Allahabad, 1998.
13. Thornbury W D: Principles of Geomorphology, John Wiley, New York, 1960.

GO 512 : ADVANCED CLIMATOLOGY

Course Outcomes:

- Understanding the basic concepts of weather phenomena
- Analysing the atmospheric interactions responsible for weather systems
- Assessment of various types of climatic classifications
- Critically evaluates Climate change and its global impact
- Acquires knowledge about application of climatology on modern world

UNIT - I

Origin of the Atmosphere – Vertical thermal structure of atmosphere – Significance of different layers of atmosphere – Insolation – Latitudinal and Seasonal variation, Passage through atmosphere: Absorption, Scattering and Reflection – Atmospheric Optics: Rainbow, Haloes, Mirage – Temperature Inversion: Types, Significance – Atmospheric Equilibrium – Atmospheric Motion: Causes of Air Motion, Vertical Motion – General Circulation of the Atmosphere: Local Winds, Jet Streams – Role of Moisture in the atmosphere – Condensation: Fog, Types – Cloud Formation and Classification – Precipitation: Mechanisms – Collision and coalescence process, Bergeron and Findeison process

UNIT - II

Tropical and Temperate Weather Systems: Tropical Cyclones – Thunderstorms – Monsoons – Origin, Characteristics and prediction – Air Masses – Origin and classification- Fronts: Frontogenesis, Types – Temperate Cyclones – Ocean – Atmosphere Interaction – El-Nino and Southern Oscillations – La Nina

UNIT - III

The Climate system – Micro, Meso and Macro-Classification of World Climates: Koeppen, Trewartha and Thornthwaite classification – Major Climates of the World: Tropical Rain Forest, Mediterranean, Tropical Deserts and Tundra Climates

UNIT - IV

Climate Changes: Definition and detection, Past and Present, Possible Causes: Natural – Anthropogenic – Ozone Depletion – Global Warming and its Impacts – Atmospheric hazards – Cloud bursts – Artificial Climate and Acid precipitation

UNIT - V

Applied Climatology – Climate and Agriculture – Weather Relations of Crops – Rice, Wheat, Tea, Coffee and Coconut – Agro-Climatic Regions of India – Drought – Definition, Classification – Weather and Diseases – Weather and human comfort - Acclimatization – Urban Climates

References:

1. Barry R G and Chorley P J: Atmosphere Weather and Climate, Routledge, London and New York, 1998.
2. Critchfield J H: General Climatology, Prentice Hall India, New Delhi, 1993.
3. Das P K: Monsoons, National Book Trust, New Delhi, 1987.
4. Fein J S and Stephens P N: Monsoons, Wiley Interscience 1987.
5. John Wallace and Peter Hobbs; Atmospheric Science-An Introductory Survey, second edition, Elsevier, 2006
6. India Meteorological Department: Climatological Tables of Observatories in India, Govt. of India, 1968.
7. KREL Karel Hughes and Julian Mays: Understanding Weather, Routledge, 2004.
8. Lal D S: Climatology, Chaitanya Publications, Allahabad, 1986.
9. Lydolph P E: the Climate of Earth, Rowman, 1985.
10. Menon P A: Our Weather, National Book Trust, New Delhi, 1989.
11. Robinson P J and Henderson S: Contemporary Climatology, Henlow, 1999.

GO 513 A : HYDROLOGY AND OCEANOGRAPHY

Course Outcomes:

- Comprehend hydrologic concepts and understand the human impacts on hydrological cycle.
- Identify various forms of precipitation and effectively role of communicate evaporation process in global hydrological cycle and demonstrate skills in estimation of interception and soil moisture
- Develop skills to measure hydrological components like precipitation, evaporation, infiltration and run off
- Apply various scientific techniques in analysis and interpretation of hydrologic data
- Identify major water quality parameters and examine the factors affecting degradation of surface and groundwater systems
- Acquires knowledge on oceanic temperature, pressure, density and salinity etc., updates on marine sediments – source and types
- Comprehend statistical, analytical and numerical methods of modelling hydrologic flow and transport processes
- Apply quantitative models towards the analysis of water quantity, quality and management problems.

UNIT - I

Hydrology – Scope – Branches of Hydrology – Applied Hydrology – Methodological approaches– Properties of water – Hydrological Cycle – Human Impacts on Hydrological cycle – Global Water Balance – Water Budget

UNIT - II

Precipitation: Types, Form, Distribution of Precipitation – Measurement of Rainfall: Spatial and Temporal methods – Evaporation: Evaporation as a process – Open Water Evaporation – Soil Evaporation – Transpiration and Total Evaporation – Measurement of Evaporation – Thornthwaite model – Interception and Surface Storage: Throughfall, Stemflow – Interception gain and loss – Depression Storage – Infiltration – Soil Water – Soil Composition and Texture – Infiltration and Soil Moisture Distribution – Estimation

UNIT – III

Surface Water systems: Drainage Basin as Geo-hydrological Unit – Catchment – Runoff Mechanisms: Overland flow, Throughflow, Subsurface flow, Base flow, Channel flow
Groundwater Hydrology: Porosity and Permeability – Zone of aeration and Saturation –Types and Properties of aquifers – Recharge, Storage, Discharge – Darcy's Law – Principles of Groundwater movement

UNIT – IV

Water Quality: Principles – Water Quality Parameters: Physical and Chemical -Temperature, Turbidity, TDS, TSS, E.coli, EC, pH, DO, BOD, Trace constituents and Heavy metal concentration – Water Quality Measurement: Gravimetric and Volumetric methods – Colorimetry – Proxy measures of Water Quality – Eutrophication – Controlling Water Quality: Concept and Practices of Water Management

UNIT – V

Physical Oceanography: Temperature, Pressure, Density, Salinity – Ekman Spiral, Ekman Transport and Upwelling – Marine Sediments: Sources and Types: Lithogenous, Biogenous, Hydrogenous and Cosmogenous sediments – Ocean Circulation; Ekman Spiral; Oceanic Eddies; Subtropical Gyres; Western Boundary Currents; Langmuir Current; Cycling and Air – Sea Exchange of Dissolved Gases

References:

- 1.Todd,D.K. and Mays.L.W.(205) Groundwater Hydrology,John Wiley & Sons.
- 2.Tim,Davie.(2009), Fundamentals of Hydrology(3rd Edition),Routledge.
- 3.A Lewis Publishers, CRC Press.ndrew. D. ward and Stanley, Trimble (2004): Environmental Hydrology, 2nd edition,
- 4.Karant, K.R., 1988: Ground Water: Exploration, Assessment and Development, Tata-McGraw Hill, New Delhi.
- 5.Ramaswamy, C. (1985): Review of floods in India during the past 75 years: A Perspective. Indian National Science Academy, New Delhi.
- 6.Rao, K.L., 1982 : India's Water Wealth 2nd edition, Orient Longman, Delhi.

7. Anikouchine W. A. and Sternberg R. W., 1973: *The World Oceans: An Introduction to Oceanography*, Prentice-Hall.
8. Garrison T., 1998: *Oceanography*, Wordsworth Company, Belmont.
9. Kershaw S., 2000: *Oceanography: An Earth Science Perspective*, Stanley Thornes, UK.
10. Pinet P. R., 2008: *Invitation to Oceanography (Fifth Edition)*, Jones and Barlett Publishers, USA, UK and Canada.
11. Sharma R. C. and Vatal M., 1980: *Oceanography for Geographers*, Chaitanya Publishing House, Allahabad.
12. Sverdrup K. A. and Armbrust, E. V., 2008: *An Introduction to the World Ocean*, McGraw Hill, Boston.
13. Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) (2014) *Landscape ecology and water management. Proceedings of IGU Rohtak Conference, Volume 2. Advances in Geographical and Environmental Studies*, Springer

GO 513 B : PRINCIPLES OF GEODESY

Course Outcomes:

- Understand and explain geodesy, its history, facts regarding shape of earth, geoid and ideas related to geographic coordinates
- Acquires knowledge on different reference systems related to geodesy, maps and map projections and to develop a clear idea of World Geodetic System
- Apply the techniques of measurement to determine directions, angles, slopes and areas; understand the earth's gravity field, its measurement and instrumentation; explain mean sea level
- Develop skills in Land surveying, acquire knowledge of modern techniques in geodesy like satellite geodesy, Doppler positioning, Laser ranging, GPS/GNSS, Laser and Radar altimetry, InSAR; and their applications

UNIT - I

Introduction to Geodesy – Definitions – History of Geodesy – Shape and dimension of the Earth – Reference Surfaces and their relationship – Spherical Earth – Ellipsoidal Earth – Geoid – Geographical Coordinates – Directions and Azimuth – Influence of the Earth curvature to surveying

UNIT - II

Datum and Coordinate Reference Systems – Vertical and Horizontal Datum – Cartesian vs. Geographic Coordinates – Maps and Map Projections – Scales – Geographic and Projected CRS – World Geodetic System – Grids and Graticule

UNIT - III

Horizontal and vertical measuring of directions, Angles and Slopes – Earth's Gravity field – Linear measurement – Direct – Optical and Electronic measurement – Methods – accuracy – Horizontal and vertical control points – Measurement of Area – Orthometric Elevations vs. Ellipsoid Heights – Mean Sea Level

UNIT – IV

Land Surveying – Classification – Topographic Surveying and Mapping – Triangulation – Traversing – Benchmarks – Contouring – Differential Survey – Great Trigonometrical Survey of India – Cadastral Surveying – Surveying organizations

UNIT – V

Modern Techniques in Geodesy – Satellite geodesy – Measurement Techniques – Earth to space methods – Doppler Positioning – Passive optical tracking – Laser ranging – GPS/GNSS – Space to Earth methods – Laser altimetry – Radar altimetry – InSAR – Space-to-space methods – Applications

References:

1. Peter Vanícek and Edward J., Geodesy: The concepts, North-Holland Publns. Co., 1991.
2. Tom Herring, "Geodesy, Elsevier, 2009.
3. Schwarze, V. S. Geodesy: The challenge of the 3rd millennium, Springer Verlag, 2002.
4. James R. Smith, "Introduction to Geodesy", John Wiley & Sons Inc. 1997.
5. Robinson A H et al, (1995) Elements of Cartography, Wiley.
6. Bomford, G., 2010. Geodesy, Oxford University Press.
7. Vanícek, P., Krakiwsky, E. J., 1987. Geodesy: The concept, 2nd Edition.
8. Torge, W., 2001. Geodesy, 3rd Edition, deGruyter, Berlin.

GO 514 : PRACTICAL PAPER – I
PHYSICAL GEOGRAPHY

Course Outcomes :

- Understand various methods of representing slopes, relief and illustration of profiles
- Acquires skills in delineation of drainage basin and identification of Thalweg
- Understand techniques of representing climatic data through Diagram and Graphs and determination of water balance
- Attains proficiency in calculating Water Balance using suitable methods
- Comprehend analytical methods for interpolation, estimation of precipitation intensity

UNIT – I

Calculation of average Slope – Wentworth’s Method, Smith’s Method of Relative Relief – Preparation of Slope Maps – Area-Height Curve – Hypsometric Curve - Profiles – Simple, Superimposed, Composite, and Projected – Block Diagrams using Layer Method and Multiple section method

UNIT – II

Drainage Basin Analysis- Delineation of Basins – Subdivisions – Stream Ordering – Strahler’s and Horton’s Methods - Bifurcation Ratio – Drainage Density – Sinuosity Index - River Thalweg

UNIT – III

Preparation of Climatic Maps and Diagrams – Representation of Climatic Data by Columnar, Linear and Circular Graphs – Frequency Graphs, Octagonal Wind Rose Diagrams, E E Foster’s Climograph

UNIT - IV

Concept of Water Balance – Calculation of Water Balance and determination of Climatic Types using Thornthwaite's Method – Determination of Climatic types using Koeppen's Method

UNIT - V

Interpolation of rainfall – Arithmetic method – Estimation of average precipitation using Thiessen Polygon method – Area Precipitation by isohyetal method – Mean basin precipitation – Rainfall intensity – Antecedent precipitation index – Estimation of infiltration index; Average filtration method, ϕ index, W Index, Ratio to surface flow method

References:

1. Monkhouse and Wilkinson: Maps and Diagrams.
2. Singh L.R: Practical Geography.
3. Applied Hydrology ,R.K.Linsley, M.A.Kohler & Paulhus

GO 521 : CONCEPTS AND TRENDS IN GEOGRAPHY

Course Outcomes:

- Understanding the chronological appraisal of Geographical Thought
- Analyses the various dimensions of Geographical Thoughts
- Evaluates recent developments in Geography
- Critically evaluates the Modern approaches and synthesis of Geography

UNIT - I

Traditions in Geography: Man-Land, Area Studies, Spatial and Earth Science tradition – Pre-history of Geographical Ideas – Greeks, Romans, Arabs and Ancient Indians – Impact of Explorations and Discoveries

UNIT - II

Modern Geographical Thought – American School: Richard Hartshorne, William Morris Davis, Ellen Churchill Semple and Ellsworth Huntington – British School: Halford J Mackinder, A J Herbertson and Roxby – German School: Alexander Von Humboldt, Carl Ritter, F Ratzel, Alfred Hettner and Albert Penck – French School: Vidal-de-la-Blache, Jean Brunhes, Elisee Reclus, Albert Demangeon – Development of Geography in modern India: Stages, Eminent Scholars

UNIT - III

Dualism and Dichotomies in Geography: Determinism v/s Possibilism, Physical v/s Human, General v/s Regional, Quantitative v/s Qualitative

UNIT - IV

Modern Trends in Geography: Quantitative Revolution – Paradigms in Geography – Systems Approach in Geography – Regional Concept in Geography – Empiricist Philosophy of Regional Geography – Modern philosophies in Geography: Pragmatism, Positivism, Functionalism, Existentialism

UNIT - V

Synthesis in Geography: Trending Towards a New Synthesis – Multi-disciplinary Approach – Scientific Explanations/Analysis – Data Explosion – Domains of Modern Geographical Research: Tools and Techniques

References:

1. Abler Ronald, Adams John S, Gould Peter: Spatial Organization – The Geographer’s View of the World, Prentice Hall, New Jersey, 1971.
2. Ali S M: The Geography of Puranas, Peoples Publishing House, Delhi, 1966.
3. Amedeo Douglas: An Introduction to Scientific Reasoning in Geography, John Wiley, New York, 1971.
4. Dikshit R D (ed.): The Art and Science of Geography-Integrated Readings, Prentice Hall of India, New Delhi 1994.
5. Hartshorne R: Perspectives on Nature of Geography, Rand McNally & Co. 1959.
6. Hussain M: Evolution of Geographic Thought, Rawat Publications, Jaipur, 1984.
7. Johnson R J: Philosophy and Human Geography, Edward Arnold, London, 1983.
8. Johnson R J: The Future of Geography, Methuen, London, 1988.
9. Minshull R: The Changing Nature of Geography, Hutchinson University Library, London, 1970.

GO 522 : THEORETICAL ECONOMIC GEOGRAPHY

Course Outcomes:

- Understanding the nature, scope and basic concepts of Economic Geography
- Critically evaluating and appreciation of Agricultural theories and indices
- Analyzing of Industrial locations through examination of various theories
- Understanding the functioning of Agglomeration economies
- Evaluating World Trade through critical appreciation of Trade Zones and Blocs

UNIT - I

Nature, Scope and Significance of Economic Geography – Resource: Definition and classification – Types of economic activity: Space, Location and Economic Activity – Resource and Economic Development – A Global Perspective

UNIT - II

Agricultural Location Theories: Von Thunen's Agricultural Location Model - Sinclair's Theory, Oloff Jonasson's Theory – Whittlesey's Classification - Merits and Demerits - Crop Diversification Indices – Rafiullah's method – Agricultural efficiency – Crop intensity

UNIT - III

Industrial and Service Location Theories: Weber's Least Cost Location Theory - Maximum Revenue Approach: Toad Palender, Edgar Hoover – August Losch's Profit Maximization - Smith's Space Cost Curve - Behavioural Matrix of Allan Pred – Product Life Cycle: Stages - Hoover Index

UNIT - IV

Agglomeration: Agglomeration Economies – O Sullivan's Empirical Estimate – Location Quotient - Growth Centre and Growth Pole Theory – Special Economic Zone (SEZ)

UNIT - V

World Trade: Current Trends, Globalization and its Impacts - WTO - Regional Trading Blocs: EEA, NAFTA, ASEAN Economic Community, SAARC, NATO, APEC, IORA, EU, BRICS, LAFTA -

World trade by Region – Western Europe, North America, Latin America, Australia, Russia, Eastern Europe and Asia

References:

1. Berry J L, Geography of Market Centres and Retail Distribution Prentice Hall, New York,1967.
2. Chatterjee S P : Economic Geography of Asia, Allied Book Agency, Calcutta, 1984.
3. Chorley, R J and Haggett P (ed.) : Network Analysis in Geography,
4. Arnold 1969. 4. Dreze J and Sen A: India -Economic Development and Social Opportunity, Oxford University Press, New Delhi, 1996.
5. wts2020_e.pdf (wto.org)

GO 523 A : REGIONAL GEOGRAPHY OF INDIA

Course Outcomes:

- Understanding the basis of regionalisation
- Appreciating the natural and human resources of the Northern Mountains
- Evaluating the physical and cultural resources of the Northern Plains
- Critical analysis of physical, human and economic resources of the Plateau region
- Acquiring in-depth understanding of Coastal India and Islands of India

UNIT - I

Basis of Regionalization: Geo-political, Climatic, Physiographic, Historic, Demographic and Socio-Economic dimensions

UNIT - II

Macro Regions: Study of Natural and Human resources, Resource utilization in the Northern Mountains

UNIT - III

Meso Regions: Physical and Cultural resources of Rajasthan Plains, Punjab-Haryana plain, Gangetic plain and Brahmaputra valley

UNIT - IV

Micro Regions: Physical, Human and Economic resources of selected regions of Peninsular Plateau: Chotanagpur, Karnataka, Malwa, Bundelkhand and Western Ghats

UNIT - V

Case studies of Micro/Meso regions in detail: Natural/Physical features: Coastal India and Islands with special reference to Andaman Nicobar and Lakshadweep Islands

References:

1. Centre for Science & Environment (1988) State of India's, Environment, New Delhi.
2. Deshpande C. D. India: A Regional Interpretation ICSSR & Northern Book Centre, 1992.
3. Dreze Jean & Amartya Sen (ed.) India Economic Development and Social opportunity, Oxford University Press, New Delhi, 1996.
4. Kundu A. Raza Moonis: Indian Economy: the Regional Dimension, Spectrum Publishers, New Delhi, 1982.
5. Robinson Francis: The Cambridge Encyclopaedia of India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan & Maldives, Cambridge University Press, London, 1989.
6. Singh R L (ed.): India – A Regional Geography, National Geographical Society, India, Varanasi, 1971.
7. Spate OHK & ATA Learmonth – India & Pakistan Methuen, London, 1967.

GO 523 B : POLITICAL GEOGRAPHY

Course Outcomes :

- Understand various approaches to study Political Geography and familiarize major schools of thought
- Classify physical and human elements of state in a geographical scenario
- Acquires knowledge about different forms of governance and changing pattern of world powers
- Critically examine geo-political significance of India and understand the concept of Unity in Diversity

UNIT - I

Definition, Nature and Scope – Recent Developments in Political Geography – Approaches to the study of Political Geography – Major Schools of Thought

UNIT - II

Geographic Elements of the State – Physical Elements – Human Elements – Economic Elements Political Geography and Environment Inertia

UNIT - III

Themes in Political Geography - State, Nation – Nation Building – Frontiers and Boundaries – Colonialism – De-Colonialism – Neo-Colonialism – Federalism and Other forms of Governance – The Changing Pattern of World Powers – Perspectives on Core-Periphery Concept – Conflicts and Co-operation

UNIT - IV

Geo-Political Significance of Indian Ocean - Political Geography of SAARC Countries

UNIT - V

Political Geography of Contemporary India with Special Reference to Changing Political Map of India - Unity in Diversity - Centripetal and Centrifugal Forces - Stability and

Instability - Inter-State Issues (like Water Disputes, Riparian Claims) and Conflict Resolutions, Insurgence in Border States – Emergence of new States – Federal India – Panchayath Raj

References:

1. Martin Jones, Rhys Jones, Michael Woods: Introduction to Political Geography – Space, Place and Political, Routledge, 2004.
2. Colin Flint: Introduction to Geopolitics, Routledge, 2011.
3. Dikshit R D: Political Geography – A Contemporary Perspective, Tata McGraw Hill, New Delhi, 1996.
4. Dikshit R D: Political Geography – A Century of Progress, Sage, New Delhi, 1999.
5. Kevin R Cox, Murray Low and Jennifer Robinson, The Sage Handbook of Political Geography, Sage Publishers, 2008.
6. Taylor Peter: Political Geography, Longman, London, 1985.

GO 524 : PRACTICAL PAPER – II

QUANTITATIVE TECHNIQUES & SURVEYING

Course Outcomes:

- Acquiring knowledge regarding the transport network analysis
- Assimilating skills in preparing thematic maps and diagrams
- Congregates the techniques of advanced surveying
- Understanding the quantitative techniques in geography

UNIT – I

Thematic Mapping: Mapping Population & Settlements, Dot Maps, Nearest neighbour, Choropleth Maps, Isopleth Maps - Potential Population Surface - Transportation Network Analysis: Measures of Accessibility, Connectivity and Efficiency of Transport Network – Preparation of Maps – Industrial Activity Analysis – Location Quotient – Thiessen Polygon for service area delineation

UNIT – II

Mapping and Analysing Agricultural Data: Index of Concentration and Diversification – Crop Combination Analysis: Weaver's, Doi's, and Coppock's Methods – Land Use Maps: Chorochromatic and Choroschematic maps - Locational Sector Diagrams

UNIT – III

Surveying : Global Positioning System, Total Station Survey

UNIT – IV

Quantitative Techniques in Geography - Measurement of Association - Simple and Multiple Correlation - Simple and Multivariate Regression - Measures of Skewness and Kurtosis – Testing Measures: Testing of Hypothesis, Test of Significance, Student's T-Test and Chi-Square Test

UNIT – V

Field Work*

*A total of 10 marks are set apart for the Field Work. Field work may be conducted within Kerala, which is limited to 5 days. Each student has to submit a bonafide report of the Field Work at the time of practical examination of this paper

References:

1. Misra R P & Ramesh A: Fundamentals of Cartography
2. Monkhouse and Wilkinson: Maps and Diagrams
3. Statistics for Geo-Scientists: Saroj K Pal
4. Jasbir Singh & Dillon: Agricultural Geography

GO 531 : GEOGRAPHY OF TOURISM

Course outcomes:

- Understand the concept, types and forms of tourism
- Identifies the motivators of tourism and tourist establishments
- Comprehending the benefits and impacts of tourism
- Able to understand the importance of passport and legalities involved in tourism
- Enhancing the knowledge about various tourist attractions in selected countries of the world, India and Kerala

UNIT - I

Historical Evolution and Development of Tourism in the World - Ancient, Medieval and Modern period – Meaning and Nature of Tourism – Definition of Tourism – Basic Components and Elements of Tourism - Forms and Types of Tourism

UNIT - II

Travel Motivations – Factors Influencing the Growth of Tourism – Role of Travel Agencies in Tourism and allied activities - Tour Itinerary - Travel Formalities: VISA, Passport, Credit Cards, Vaccination certificates, Special Permits etc.

UNIT - III

Foreign Travel Checklists: Need and relevance - Accommodations and their importance – Types of Hotels, Supplementary Accommodations – Role of Transportation in Tourism Development – International Organizations in Tourism – Impacts of Tourism: Economic, Socio-Cultural and Environmental Impacts – Multiplier Effect on the Economy by tourism activity

UNIT - IV

Tourism and Planning: Relevance, Development and Environmental aspects - Major Natural and Cultural Attractions of Canada, South Korea, New Zealand, Belgium and Israel

UNIT - V

Growth and Development of Tourism in India - Tourism in North and North East India: Major Natural and Cultural Attractions of Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and Manipur - Problems and Prospects of tourism in India - Tourism in Kerala: Eco-tourism Destinations

References:

1. Bhatia A K: Tourism Development - Principles and Practices, Sterling Publishers, NewDelhi, 1996.
2. Bhatia A K: International Tourism - Fundamentals and Practices, Sterling Publishers, New Delhi, 1991.
3. Chandra R H: Hill Tourism Planning and Development, Kanishka Publishers, New Delhi .1998.
4. Hunter C and Green H : Tourism and the Environment, Routledge, London 1995.
5. Inskeep E: Tourism Planning - An Integrated and Sustainable Approach, Von Nostrand and Reinhold, New York, 1991.
6. Lea J: Tourism and Development in the Third World, Routlege, London, 1988.
7. Milton D: Geography of World Tourism, Prentice Hall, New York, 1993.

GO 532 : PRINCIPLES OF REMOTE SENSING

Course Outcomes:

- Congregates knowledge about the process of remote sensing and energy interactions
- Develops the skills of aerial photo analysis and photogrammetric applications
- Understanding the resolutions of sensors and various satellite programmes for remote sensing data acquisition
- Developing the knowledge and skills in Digital image processing
- Assess the role of remote sensing technology in solving problems in the society

UNIT - I

Remote Sensing: Definition, Components, Energy source – Electromagnetic radiation principles: Wave model and the Particle model - Energy interactions with the atmosphere and Earth surface, Electromagnetic Spectrum – Sensors – Ideal and real remote sensing systems – Spectral reflectance - History of Remote Sensing in World scenario

UNIT - II

Aerial remote sensing: Camera, Axis, Lens, Angle of Coverage, Scale – Marginal information on Aerial Photographs - Relief Displacement: Parallax and Height Measurement – Stereo Model – Photomosaics – Flight Planning for aerial photography missions – Photogrammetry: Digital Photogrammetry, Applications of Photogrammetry in Urban Planning

UNIT - III

Satellite Remote Sensing: Types of Satellites – Resolution: Spatial, Spectral, Radiometric and Temporal – Satellite Programs of various Countries and Organizations: Landsat, Spot, IKONOS, IRS, and Digital Globe – Applications of remote sensing: Microwave, Infra-red, Hyper Spectral, LIDAR, Thermal, and Radar – Online sources of remote sensing data: USGS Earth Explorer, NASA Earth Observation, BHUVAN: Indian Geo-Platform of ISRO – Copernicus Open Access Hub

UNIT – IV

Digital Image Processing: Image Rectification, Geometric Correction, Radiometric Correction, Noise Removal, Image Enhancement – Image Classification: Supervised and unsupervised – Scope and Limitations of Digital Image Processing

UNIT – V

Applications of Remote Sensing in Agriculture, Land Use, Disaster management, Urban Planning, Hydrology, Geology, Environment Assessment, Wildlife studies and Archaeology

References:

1. Lillesand T. M and Kiefer R. W, Remote sensing and Image Interpretation, John Wiley and Sons
2. Campbell, James, Introduction to Remote Sensing, Gullifor Press.
3. Jensen J. R. Introductory Digital Image Processing – A Remote Sensing Perspective, Prentice Hall
4. Dong, Pinliang and Qi Chen, LIDAR Remote Sensing and Applications, CRC Press, Taylor and Francis Group.
5. <https://geoawesomeness.com/list-of-top-10-sources-of-free-remote-sensing-data/>

GO 533A : RESEARCH METHODOLOGY IN GEOGRAPHY

Course Outcomes :

- Comprehend the basic ideas and concepts salient to research processes and its role in scientific development
- Acquire an ability to formulate plan and outline for a research activity
- Identify and discuss the concepts and procedures of sampling, data collection and analysis
- Understand data sources and acquisition tools for research processes
- Formulate a research report incorporating ethical aspects of research

UNIT - I

Research: Meaning and Definition – Need for Scientific Research – Types of Research – Applied and fundamental Research in Geography – Concepts of Theories and Laws in Geography

UNIT - II

Research Design: Identification of Problems – Review of Literature – Hypothesis – Formulation of Hypothesis – Testing of Hypothesis in Geography – Use of Models and Empirical Techniques in the Analysis of Geographical Problems

UNIT - III

Sampling: Types of Sampling – Spatial Sampling – Aerial, Line and Point Sampling – Significance of Sampling in Geographical Research

UNIT - IV

Data Acquisition and Analysis: Collection of data – Primary and Secondary data – Alternative Sources of data – various Methods of Primary Data Collection – Schedule, Interview – Drafting on Questionnaire – Data Preparation Process

UNIT - V

Thesis Writing: Organization of the Thesis – the Preliminaries: the Text and Reference materials – Drafting of the Thesis – First, Second and Final drafts – Preparation of

Bibliography – Writing of Abstracts, Research papers for Seminars and Conferences – Journal Publications, Research Ethics - Ethical issues, Ethical committees – Intellectual property rights – Patent laws, Copyright, Royalty – Plagiarism and its types

References:

1. Basil Gomez & John Paul Jones III(ed.): Research methods in Geography – A Critical Introduction, Wiley-Blackwell, London, 2010.
2. Danier R Montello & Paul Sutton: An Introduction to Scientific Research Methods in Geography, Sage Publications, 2006.
3. Iain Hay : Qualitative Research Methods in Human Geography, Oxford University Press.
4. Robin Flowerdew & David Lozell Martin: Methods in Human Geography – A Guide for students Doing a Research Project, Prentice Hall, 2005.
5. Kothari C R : Research Methodology – Methods and Techniques, Vishwaprakashana, New Delhi, 1990.

GO 533 B : GEOGRAPHY OF HEALTH

Course Outcomes:

- Understanding the concept of Medical geography
- Learning the nature and characteristics of Disease ecology
- Acquire knowledge regarding Communicable and Non-Communicable diseases
- Able to gather comprehensive knowledge about the emerging health problems and their impact

UNIT - I

Medical Geography – Origin and Development – Traditional and Contemporary considerations – Approaches to the Study of Medical Geography

UNIT - II

Disease Ecology – Epidemiology – Disease Diffusion – Tropical Diseases – Infectious and Non- Infectious Diseases – Environmental Factors responsible for the occurrence of Diseases like Malaria, Filariasis, Tuberculosis, Bronchitis – Respiratory Issues: SARS Covid -19, Asthma – Cardio-Vascular Diseases: Occurrence

UNIT - III

Changing urban Environment and emerging Health Problems – Incidence of Communicable and Waterborne Diseases – Control measures – AIDS in Kerala – Geography of Malnutrition and Hunger in India – Vitamin Deficiency Diseases – Prone Areas – Problems and Issues

UNIT - IV

Health Status of Kerala – Mortality and Morbidity in Kerala, Major Health Issues and related determinants

UNIT - V

Geography of Healthcare - Location and use of Healthcare Facilities – Healthcare Delivery systems in India – Distribution of Healthcare Systems in Kerala – Modern and Traditional Healthcare Delivery System – Modern technologies in Medicine: Telemedicine, M-Health and e-Health

References:

1. McGlashan N D: Medical Geography, Methuen, London, 1972.
2. Learmonth A T A: Patterns of disease and Hunger – A Study in Medical Geography, David & Charles, Victoria, 1978.
3. May J M: Studies in Disease Ecology, Hafner Publications, New York, 1961.
4. Rais Aktar and Learmonth A T A: Geographical Aspects of Health and Diseases in India.
5. Philips D R: Health and Healthcare in the Third World, Longman, London 1990.

GO 534: PRACTICAL PAPER – III REMOTE SENSING

Course Outcomes :

- Identify the different features from imageries based on visual interpretation keys
- Apply principles of Remote sensing to collect, map and retrieve spatial information
- Demonstrate higher level of professional skills to tackle multidisciplinary and complex problems related to Remote Sensing
- Process the remotely sensed with satellite image processing techniques
- Classify the processed remote sensing data and Evaluate the accuracy of image classification
- Apply the advanced processing methods for deriving the useful information

UNIT – I

Visual Interpretation of Aerial Photographs – Land use/Land Cover Mapping – Physical and cultural features – Visual Interpretation of Satellite Images – Metadata – Land Use/Land Cover Mapping

UNIT – II

Remote Sensing Data – Import/Export – Image Display – Grey scale image, Pseudo image and False Colour Composite – Image Info – Link/Unlink Viewers – Blend, Swipe and Flicker – Spatial Profile – Spectral Profile

UNIT – III

Digital Image Processing: Pre-processing – Layer stacking and Band Combinations – Image registration through GCP-image to image registration – Mosaicking – Image sub setting- Image Reproject – Rubber sheeting – Spatial Enhancement – Convolution – Focal Analysis – Resolution Merge – Texture – Crisp – Adaptive Filter – Statistical Filter – Radiometric enhancement – Destripe – LUT stretch – Histogram equalization – Histogram match – Brightness – Spectral enhancement – Principal Components - Indices

UNIT – IV

Topographic analysis – Slope Aspect – Level Slice – Shaded relief – Painted relief – DEM height converter – Viewshed Analysis – Spatial Modeller – Map Composer

UNIT - V

Image Classification Techniques: Unsupervised and Hybrid classification techniques, classification analysis – Confusion matrix, Error analysis & Kappa coefficient, Analysis of Multi-Temporal series and Change detection

Supervised Classification, Training set – Statistical computation, Understanding feature space & Scatter plots, Signature purity & Separability, Signature Bayes' decision rule, Non-parametric & Parametric classification techniques, Minimum distance rule, Parallelepiped algorithm, Maximum likelihood method

References:

1. Avery T E: Interpretation of Aerial Photographs
2. Reeves Robert G: Manual of Remote Sensing
3. Muller: Digital Image Processing in Remote Sensing.
4. John R Jensen: Introductory Digital Image Processing.
5. Erdas Imagine Tour Guide
6. Erdas Imagine Field Guide

GO 541 : ENVIRONMENTAL MANAGEMENT

Course Outcomes :

- Understand the scope and goals of environmental management
- Evaluate the status of disturbed ecosystems
- Understand the concept of restoration ecology
- Plan appropriate strategies for EIA and Environmental Auditing
- Apply various environmental management techniques to practical situations
- Appreciate the environmental policies and laws

UNIT - I

Introduction and scope of Environmental Management – Goals of EM – EM and sustainable development – EM Tools

UNIT - II

Restoration Ecology – Ecology of Disturbed Ecosystems: disturbance and its impact on the structure and functioning of terrestrial and aquatic ecosystems. Aims and strategies of restoration: Concepts of restoration, Single vs. Multiple end-points; Ecosystem reconstructions; Physical, Chemical, Biological and Biotechnological tools of restoration
Restoration of biological diversity: Acceleration of Ecological Succession, Reintroduction of biota – Degradation and restoration of natural ecosystems: Forests, Grassland, Savannah, Aquatic – Restoration of degraded soils: Restoration of contaminated soils and Soil fertility, Mine spoil restoration

UNIT - III

Environmental Impact Assessment – Environmental Impact Assessment (EIA), General guidelines for the preparation of environmental impact statement (EIS), Scope and Types of Environmental Audit, Cost Benefit Analysis, Environmental Management Plan (EMP), International Organization for Standardization (ISO), ISO – 14000 standards and certification, Environmental clearance for establishing Industry, Environmental safety, Risk management and Emergency preparedness, International summit and treaties

UNIT - IV

Environmental Management Techniques – Environmental monitoring and modelling – Sensitivity Analysis – Application of Remote sensing and GIS in EM – Environmental profile – Environmental technology assessment – Environmental Risk Assessment – Rapid Urban Environmental Assessment – Eco-mapping – Environmental education

UNIT - V

Environmental Legislation – Definition of Environment and Pollutants, Central and State boards for the prevention and control of environmental pollution, Powers and Functions of Pollution Control Boards (PCB), Penalties and procedure, Duties and responsibilities of citizens for Environmental protection – Wildlife Protection Act, 1972 – The Water (Prevention and Control of Pollution) Act, 1974 – Prevention and Control of Air Pollution Act 1981 – Forest Conservation Act, 1981 – Environment (protection) Act, 1986 – Hazardous waste (Management and Handling) Rules, 1989 – Bio-Medical Wastes (Management and Handling) Rules, 1998 – Coastal Regulation Zone (CRZ) – Issues involved in enforcement of Environmental legislation, Public awareness, Public Interest Litigations (PILs) and its role in control of Environmental Pollution in India

References:

1. Vijay Kulkarni, T.V.Ramachandra, Environmental Management, Commonwealth of Learning, Indian Institute of Science, Bangalore, 2006.
2. Mary K. Theodore and Louis Theodore, Introduction to Environmental Management, CRC Press, 2021
3. Ajith Sankar R.N., Ajith Sankar, Environmental Management, Oxford University Press, 2015
4. Chris Barrow, Environmental Management for Sustainable Development, Routledge, 1999
5. G.N.Pandey, Environmental Management, Vikas Publishing House, Pvt.Ltd, 1997
6. Timothy O Riordan, Environmental Science for Environmental Management, Routledge, 2000

GO 542 : URBAN AND REGIONAL PLANNING

Course Outcomes:

- Acquiring knowledge regarding the Classification of Towns by different scholars
- Congregating the awareness of theories on Urban Development
- Understanding the Urban problems and Morphology of towns
- Identifying various types of Regions and their structure
- Awareness regarding the levels of Planning in India

UNIT - I

Nature, Scope and Significance of Urban Geography – Origin and Evolution of Urban Centres – Location and Siting of Urban Centres – Classification of Urban Centres: based on Age, Stage and Population – Classification of Urban Centres: on the basis of Size and Function – Rank-Size Rule by Zipf – Harris and Nelson's Scheme of Town Classification – Classification of Indian Cities by Ashok Mitra

UNIT - II

Urban Theories and Models: Central Place Theory – Theories by Burgess, Harris and Hoyt – Urban Morphology: Central Business District (CBD) and its Characteristics, Urban Fringe: Its Characteristics and Development

UNIT - III

Morphology of Selected Indian Cities: Varanasi, Lucknow, Jaipur and Jamshedpur – Urban Housing: Urban Housing Policies and Programmes in India – Slums and their characteristics – Urbanisation in India: Salient Features, Problems and Prospects

UNIT - IV

Geographical Perspectives in Regional Planning and Development – Types of Regions: Formal, Functional and Planning Regions – Regional Hierarchy – Methods of Regional Delineation – Theories of Regional Planning: Growth Centres Theory (Perroux), Spread Effect and Backwash Effect Theory (Myrdal), Tricking Down and Polarization Effect Theory (Hirschman)

UNIT – V

Regional Planning and Development in India – Regional Imbalances in Development in India – Strategies for Special Regions: Hill Region, Tribal Region, Flood Prone Region, Drought Prone Region – Watershed planning in India - Concept of Micro Level Planning – Decentralized Planning with reference to District, Block and Panchayat.

References:

1. Alam S M: Hyderabad –Secunderabad Twin Cities, Asia Publishing House, Bombay.
2. Richard Chorley and Peter Haggett: Integrated Models in Geography, Roulledge
3. Alan Wilson: Urban Modelling, Roulledge, 2012.
4. Kevin Archer: The City –The Basics, Roulledge, 2012.
5. David Kaplan, James O Wheeler and Steven Holloway: Urban Geography, Wiley, 2008.
6. Truman Asa Hartshorn : Interpreting the City – An Urban Geography, Wiley, 1992.
7. Alber R, et. al.: Spatial Organization – The Geographers View of the World, Prentice Hall
8. Bhat L S: Regional Planning in India, Statistical Publishing Society, Calcutta, 1973.
9. Bhat L S et. al.: Micro Level planning – A case study of Karnal area, Haryana, K.B. Publications, New Delhi, 1976.
10. Chorly R J & Haggett P: Models in Geography, Metheun, London, 1967.
11. Gosal G.S and Krishnan G: Regional Disparities in Levels of Socio-Economic Development in Punjab, Vishal Publications, Kurukshetra, 1984.
12. Government of India, Planning Commission: Third Five year Plan, Chapter on Regional Imbalances in Development, New Delhi, 1961.
13. Mahesh Chand, V K Puri: Regional Planning in India, Allied Publishers Ltd., New Delhi.
14. Jayasri Ray Chaudhuri: An introduction to Development and Regional Planning with special reference to India, Orient Longman Ltd.

GO 543 A : GEOGRAPHIC INFORMATION SYSTEM

Course Outcomes:

- Acquiring knowledge about the process of GIS and its components
- Analyzing the Spatial Data Management tools and techniques in GIS
- Congregates the Web and Mobile based GIS application in problem solving
- Evaluating the natural and man-made systems using GIS models and methods

UNIT - I

GIS: Definition, Components – Data in GIS: Spatial Data, Attribute Data and their characteristics – Sources of Spatial and Attribute data: Data input and editing: Data Input techniques, Errors and Rectification, Transformation and Generalization

UNIT - II

Spatial Data Models: Vector and Raster Data Models: Comparison of Raster and Vector data – Spatial Data Structures – Spatial and Attribute data Modeling

UNIT - III

Spatial Data Management: Database Management System, RDBMS – Linking Spatial and Attribute data – Spatial data analysis: Measurement of length, perimeter and area – Query Models – Reclassification – Buffer Analysis – Neighborhood functions- Overlay Analysis and Boolean Operators

UNIT - IV

Spatial Decision Support Systems: Spatial Analysis, Spatial Interpolation and Surface Analysis – Modeling Surfaces: Trend Surfaces and Digital Elevation Models – Modeling Networks : Network analysis

UNIT - V

Web GIS and Mobile GIS: Basic Concept and Components, Possibilities and Prospects - Open source software: QGIS, ILWIS, SAGA GIS, Geo Server – Open Data Sources for GIS analysis: Open Street Map, USGS Earth Explorer, NASA's Socio-Economic Data and Applications Center

(SEDAC), United Nations Environmental Data Explorer, FAO, Geo Network – Location Allocation and Facility Management using GIS – Applications of GIS: Disaster Management, Agriculture, Urban Planning, Environment and Wildlife, Hydrology, Disease Management

References:

1. Burrough P.A: Principles of GIS
2. Heywood, Ian, Sarah Cornelius and Steve Carver: An Introduction to Geographical Information System
3. Magune D: Geographical Information System – Principles and Application
4. <http://nptel.ac.in/courses/105102015/>
5. http://web.mit.edu/11.520/www/lectures/internet_gis08_slides.pdf
6. www.ent.mrt.ac.lk/dialog/documents/GIS%20for%20LBS.ppt
7. http://spatial.ucsb.edu/eventfiles/docs/WebGIS_Principles_and_Applications_UCSB.pdf
8. <https://gisgeography.com/best-free-gis-data-sources-raster-vector/>
9. <https://scihub.copernicus.eu/dhus/>

GO 543 B: GLOBAL POSITIONING SYSTEM

Course Outcomes:

- Understand and explain the GPS design objectives, components of GPS, its errors and accuracy; describe the GPS signal structure and characteristics, types and structures of GPS receivers and explain the principles of GPS position fixing
- Understand and describe the different GPS survey methods, the procedures adopted, positioning, accuracy checking and post processing measure

UNIT - I

Introduction to GPS – History and Development – Kepler's Law – Doppler effect - Positioning concept – Transit, Timation – SECOR – NAVSTAR GPS – GNSS – GLONASS system, Galileo System – Advantages and current limitations of GPS – Applications of GPS

UNIT - II

GPS design objectives – Components of GPS: Space Segment, Control Segment, User Segment – Satellite configuration – Orbit determination – GPS Error and Accuracy

UNIT - III

GPS Signal Structure and Characteristics – Structure of GPS Signal, Frequency, P Code, C/A code and data format – Generation of C/A code – Navigation data bits – GPS receiver: Types and Structure of receivers, Principles of GPS position fixing – Pseudo ranging

UNIT - IV

GPS Survey Methods – Single Point or Point v/s Relative, Static v/s Kinematic, Real time v/s Post mission – Practical GPS survey field procedures: Code and Carrier – Based positioning, Accuracy and recording time GPS Data Processing – Ambiguity resolution – Post processing – Real-time processing – Accuracy measures – Software Modules – GIS and GPS data integration

UNIT - V

Applications of GPS Technology – Navigation v/s Mapping v/s Surveying – Environmental Monitoring – Commercial Applications – Engineering – Agricultural Applications – Precision Navigation – Military Applications

References:

1. G. S. Rao, 2010. Global Navigation Satellite Systems. Tata McGraw Hill Education Pvt.Ltd.
2. Guocheng Xu, 2003. "GPS Theory, Algorithms and Applications" Springer-Verlag.
3. Gunter Seeber, 1993. Satellite Geodesy, Copy Right 2003 By Walter De Gruyter, ISBN:3-11-017549.
4. Hofmann W. B., Lichtenegger. H, Collins J., 2008. Global Positioning System – Theory and Practice – Springer Verlag Wein, New York.
5. Alfred Leick, 2004. GPS Satellite Surveying, 3rd Edition, John Wiley and Sons.

GO 544 : PRACTICAL PAPER – IV
GEOGRAPHIC INFORMATION SYSTEM

Course Outcomes:

- Acquiring skills to compile, analyse, and present Geospatial data
- Emphasizing the value of visual communication and basic Geospatial concepts
- Assimilation of industry standard GIS Technology in day to day applications

UNIT – I

Georeferencing using ArcGIS– Creating Geo-database – Digitizing: Point, Line and Polygon data – Topology building – Editing Attribute data – Tables Join – Adding delimited text layer

UNIT – II

Creating Thematic Maps using ArcGIS : Representing Single data, Multiple data – Symbolization : Dot maps, Located diagrams – Map Layout – Exporting /Saving map in Arc GIS

UNIT – III

Spatial Analysis using ArcGIS : Spatial Query – Spatial Join – Overlay Operations – Buffering – Geometric Measurements – Hotspot analysis – Nearest Neighbour Analysis – Network Analysis – Watershed Analysis – Surface Analysis : Spatial Interpolation

UNIT – IV

GIS Programming in Applications – C++, .NET, C# - Fundamentals and Best Practices of Python Programming – Leaflet and Open Layers – Building Sophisticated Web Maps

UNIT – V

Study Tour/Field Work*

*A total of 25 marks are set apart for the Study Tour/Field Work can be to any destination inside the country, which is limited to 10 days.

References:

1. Mitchell, Andy. The ESRI Guide to GIS Analysis, Volume 2. ESRI Press, 2005. ISBN: 978-1-58948-116-9

2. Longley, Paul A., Michael F. Goodchild. Geographic Information Systems and Science.

John Wiley & Sons, 2010. ISBN: 047087001X

3. O'Sullivan, D. and D. Unwin. Geographic Information Analysis. John Wiley & Sons, 2003.

NOTE:

1. The Department shall approve the topics for Dissertation and it will be valued by a panel of examiners. Two typed copies of dissertation has to be submitted at the end of IV Semester, to the concerned Department.
2. A Comprehensive Viva-Voce examination for a maximum of 100 marks shall be conducted at the end of the IV Semester.

INSTRUCTIONS TO QUESTION PAPER SETTERS

The syllabus of each theory paper has **5 units**. While setting question paper equal weightage is to be given to **each unit**. Each question paper is for an examination of three hours duration and has three sections viz., Section A, Section B, and Section C, constituting a total of 75 marks as detailed below.

Section A: Five questions, one each from each unit containing three short answer type questions marked a, b, and c. The student has to answer two questions from each of the five questions (10 x 2 = 20 marks).

Section B: Five questions each from one each unit containing two short essay type questions marked a and b. The student has to answer any one question from each of the five questions (5 x 5 = 25 marks).

Section C: Five essay questions, one each from each unit. The student has to answer any three questions (3 x 10 = 30 marks).