THANTHAI PERIYAR GOVERNMENT ARTS AND SCIENCE COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-23.										
GENERAL COURSE PATTERN FOR PG - SCIENCE - 2023-2024										
SL. NO.	**PART**	**COURSE**	**Sub-Code**		**COURSE TITLE**	**Hrs.**	**Credits**	**CIA**	**Sem. Exam**	**Total**
I SEMESTER										
1	-	Core	I		Principles of Cartography	6	5	25	75	100
2	-	Core	II		Applied Geomorphology	6	5	25	75	100
3	-	Core	III		Population Geography	5	4	25	75	100
4	-	Core	IV		Settlement Geography	5	4	25	75	100
5	-	Core	V-P		**Techniques of Mapping and Map Analysis**	6	4	40	60	100
6		SEC	I		Skill Enhancement Course - I Seminar	2	2	25	75	100
					TOTAL	**30**	**24**	**165**	**435**	**600**
II SEMESTER										
7	-	Core	VI		Applied Climatology	5	5	25	75	100
8	-	Core	VII		Remote Sensing and Its Applications	5	4	25	75	100
9	-	Core	VIII		Principles of GIS and GNSS	5	5	25	75	100
10	-	Core	IX-P		**Geo-spatial lab**	5	4	40	60	100
11		CBE	I		Discipline Specific Elective - I Transport Geography	5	3	25	75	100
12	-	NME	I		Non-Major Elective - I :Geography of Tamil Nadu	3	2	25	75	100
13		SEC	II		Technical writing	2	2	25	75	100
					TOTAL	**30**	**25**	**190**	**510**	**700**

III SEMESTER

14	-	Core	X		Geographical Thought	6	5	25	75	100
15	-	Core	XI		Political Geography	5	4	25	75	100
16	-	Core	XII-P		**Terrain Mapping Analysis**	5	4	40	60	100
17	-	CBE	II		Discipline Specific Elective - II Hydrology and Oceanography	4	3	25	75	100
18	-	CBE	III		Discipline Specific Elective - III Geography of Tamil Nadu	5	3	25	75	100
19		NME	II		Non-Major Elective - II : Geography of India	3	2	25	75	100
20		SEC	III		Skill Enhancement Course - III Mapping of Geodata base	2	2	25	75	100
					TOTAL	**30**	**23**	**190**	**510**	**700**

IV SEMESTER

21	-	Core	XIII		Geography of India	6	4	25	75	100
22	-	Core	XIV-P		**Quantitative Techniques in Geography**	5	4	40	60	100
23	-	CBE	IV		Discipline Specific Elective - IV Regional Planning	5	3	25	75	100
24	-	SEC	IV		Skill Enhancement Course - IV Research Methodology in Geography	2	2	25	75	100
25		EA			Extension Activity Field Work	-	1	25	75	100
26		Project			Project	12	4	25	75	100
					TOTAL	**30**	**18**	**165**	**435**	**600**
					GRAND TOTAL	**120**	**90**	**710**	**1890**	**2600**

SL. NO.	PART	COURSE	Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
I SEMESTER									
1	-	Core I		Principles of Cartography	6	5	25	75	100

Course Objectives:

1. To Understand the scope and development of Cartography.
2. To study the map making process, map design and layout and cartography.

Unit – 1	**Cartography as an Integrated Discipline**: Nature and Scope of Cartography – Meaning of Maps, Types and Uses of Maps – Artistic Learning and Scientific Bases of Cartography, Cartography as a profession.
Unit – 2	**History and development of Cartography**: Ancient Period – Late Medieval Period – Early Modern Period – Recent Period – Development of Cartography in India.
Unit – 3	**Map Making Process**: Compilation – Compiling of Physical and Cultural Details – Selection of Details – Elements of Generalization: Simplification, Classification and Symbolization – Thematic and Complex Mapping: Types and Problems.
Unit – 4	**Map Design and Layout:** Principles – Theory of Visual Perception – Making Symbols Visually Significant, Constraint in Map Design – Map Format – Maps for children, Neo – Literates and Blind.
Unit – 5	**Digital Cartography:** Generating cartographic data – Computer cartography – Automated cartography: Digital cartography – thematic applications.
Unit – 6	SOI, NATMO function, Web mapping – open sources, online & cloud computing mapping software – GIS Programming languages for mapping.

Programme Outcomes:

1	Comprehend the scope and development of cartography	
2	Know the development of cartography.	
3	Sound knowledge on map making process.	
4	Understand the map design principles.	
5	Know about the advanced cartography and its applications.	

Programme specific outcomes

1	Types of maps-uses of maps, scientific bases of cartography.	
2	Compiling of physical and cultural details	
3	Point, line, area symbols.	
4	Map designs, map lay out	
5	Uses of PC in cartography analysis	

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

Text Book(s)

1	Misra, R. P. and Ramesh, A., (2014), Fundamentals of Cartography, Concept Publication Company, New Delhi.
2	Robinson, A. H., (1984), Elements of Cartography, John Wiley, London

Reference Book(s)	
1	**Kraak M. J. (2010) Cartography: Visualization of Geospatial Data (3rd edition), Pearson Education Ltd., London.**
2	Erwin Raiz, (1948), General Cartography, McGraw Hill Company., New York.
3	Lawrence, G. R. P., (1979), Cartographic Methods, Methuen, London.
4	SethuRakkayi, S., (2014), Puvippadaviyaloruarimugam, SreeMeenakshi Offsets, Madurai.
Related Online Contents: [MOOC, SWAYAM, NPTEL, Websites etc.]	

SL. NO.	PART	COURSE	Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
I SEMESTER									
2	-	Core II		Applied Geomorphology	6	5	25	75	100

Course Objectives:

At the end of the course students able to

1. To Explain the basic concepts and contents of Geomorphology
2. To Examine geomorphic and gradation process and it associated land forms

Unit – 1	**Geomorphology** – Definition – Fundamental Concepts – Scope – Solar System – Natural Satellites – Origin and evolution of the earth: Concept of Gaseous Hypothesis at Kant, Nebular Hypothesis at Laplace, Tidal Hypothesis at James Jeans – Theory of Isostacy – Geological – time – scale.
Unit – 2	**Interior of the Earth Structure**: Structure of earth – Theory of Plate Tectonics and Wegener's Theory of Continental drift – Volcanoes: Components, Types, Materials, Impact craters, Major zones – Earthquakes: Weaves and Types, Causes, Earth Quake Zones of the World.
Unit – 3	**Rocks**: Types, Characteristics and Minerals – Relief Features – Diastrophic Movement: – Orogenetic Movement: Folds: Types, Nappes – Fault, Type of Faults and Rift Valley – Drainage system and Drainage Patterns.
Unit – 4	**Exogenetic force**: Process of Weathering and Mass Movement – Critical Study of the Concept of Cycle of Erosion view of W. M. Davis and W. Penk's, Wood's
Unit – 5	**Denudational Process**: Erosional, Transportation and Depositional Land forms of Fluvial, Karst, Aeolian, Glacial and Costal of these and land form produced.
Unit – 6	**Application of geomorph**ology: Natural Hazards and Environment Management – Climate Geomorphology – Morphogenetic Regions.

Programme Outcomes:

1	After the completion of course, the students will have ability to: Understand the fundamental concept and evolution of earth with suitable theories.	
2	Assess different aspects of earth structure and sudden force, plate movement and continental drift theories and formation of orogenetic movement landforms.	
3	They know about the rocks, fold, fault and drainage pattern.	
4	Students know about the exterior parts of earth.	
5	Differentiate denudational agents and their work on the earth surface	

Programme specific outcomes

1	Origin of earth and its related theories	
2	Major and minor plates	
3	Igneous, sedimentary and metamorphic rocks	
4	Weathering types – normal cycle of erosion	

5	Agents of denudation – landform features	
K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create		
Text Book(s)		
1	Dayal P. (1995) A Text Book of Geomorphology 2nd Edition. SuklaBook, Patna.	
2	Kale. S Vishwas and Avijit Gupta, (2015), Introduction to geomorphology, Universities Press (I.)Pvt.Ltd.	
Reference Book(s)		
1.	Strahler., A. N. &Strahler A. H. (1984) Elements of physical Geography. John Wiley	
2.	Savindra Singh (2021), Physical Geography, PrayagPustakBhawan, Allahabad.	
3.	Savindra Singh (2021), Geomorphology, PrayagPustakBhawan, Allahabad	
4.	William D. Thorn bury. (2004) Principles of Geomorphology. CBS Publishers & Distributers Pvt.Ltd.	
Related Online Contents: [MOOC, SWAYAM, NPTEL, Websites etc.]		

SL. NO.	PART	COURSE	Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
I SEMESTER									
3	-	Core		Population Geography	5	4	25	75	100

Course Objectives:

1. To study the concepts and attributes of population
2. To Identify various theories of population and concept of socio – economic development

Unit – 1	**Population Geography:** Definition, Nature, Scope and Development – Population Geography and Demography – Sources of Population Data: Census, Registers and Sample Survey.
Unit – 2	**Population distribution and Density:** Population Growth, Pattern of World population, Population distribution and Density, Population Growth and Pattern in India, Factors affecting distribution, Growth and density of population.
Unit – 3	**Population Composition** – Age, Sex, Race, literacy, religion, rural and urban population, Components of population growth – Fertility Rate, Mortality Rate – Migration – Types of migration, Determinants and Consequences of Migration, Population Projection methods and population Pyramid.
Unit – 4	**Theories of Populatio**n – Malthusian Theory, Theory of Optimum, Over and Under Population by Dalton and Robbins, Demographic Transition Theory by W. S Thompson
Unit – 5	**Population and development**: Population resource regions and levels of population and social economic development: Human Development Index (HDI) and its components – India's population policies – – Ageing of Population – Declining Sex Ratio – Population health issues – HIV/AIDS – Population and Environment Implication for the Future. Contemporary Issues.
Unit – 6	**National Population control measures:** Disease, Bio war, – Internal and external migration – Refuges

Programme Outcomes:

1	The sources of population data, sample survey and data reliability	
2	The patterns and processes of population growth and it implications.	
3	Population composition and occupational Structure characteristics	
4	The different aspects of Malthus, Dalton, Robbins and W. S Thompson. Demographic Transition theories	
5	Population policies for developed and developing countries with contemporary issues in India	

Programme specific outcomes

1	Nature, Scope and Development –Census, Registers	
2	Growth, density, Distribution of world and India	
3	Age, Sex, Race, literacy, religion, rural and urban population of India.	
4	Theories: Malthus demographic over, under population.	
5	Population resource regions and HDI	

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create	
Text Book(s)	
1	Ghosh. B. N. (1987) – Fundamentals of Population Geography, Sterling Publishers Ltd., New Delhi
2	Barrett H. R., 1995: Population Geography, Oliver and Boyd
Reference Book(s)	
1	Glenn. T. Trewartha – Geography of Population – World pattern, John Willey and Sons Publications
2	Chandna R. C. and Sidhu M. S., 1980: An Introduction to Population Geography, Kalyani Publishers
3	Bhende A. and Kanitkar T., 2000: Principles of Population Studies, Himalaya Publishing House.
4	Clarke John. I. (1981) – Introduction to Demography, Surjeet Publication, New Delhi
Related Online Contents: [MOOC, SWAYAM, NPTEL, Websites etc.]	

SL. NO.	PART	COURSE	Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
I SEMESTER									
4	-	Core	IV	SETTLEMENT GEOGRAPHY	5	4	25	75	100

Course Objectives:

1. To explain the formation and principles of settlements.
2. To study the distribution, pattern, and characteristics of settlements.

Unit – 1	**Settlement Geography**: Meaning, Nature, Scope and development of Settlement: Origin – Site and situation of Settlements types – Fundamental concepts in settlement Geography.
Unit – 2	**Rural Settlement**: Meaning, Factors affecting Rural settlements – Origin and evolution of Rural settlements – Types – Size and spacing of Settlements – Rural Morphology: Theories of Origin of Towns (Gordon Childe, Henri Pirenne, Lewis Mumford),
Unit – 3	**Urban**: Types, patterns and morphology of urban settlements; Urban development's; Morphology of Indian cities; Functional classification of Indian cities; Conurbations and metropolitan regions; Urban sprawl; Slums and associated problems; Town planning; Problems of urbanisation and remedies.
Unit – 4	**Urbanization**: Characteristics and Processes of Urbanization in Developed and Developing Countries (factors of urban growth, trends of urbanisation, size, structure and functions of urban areas).
Unit – 5	**Urban Issues**: Water, Energy, Housing, Health – Urban Slums – Transport, Environment issues – Town and country planning and restructuring- Smart City: Technology used in smart Cities – Challenges and Opportunities Future of Smart city.
Unit – 6	**Contemporary Problems** of Rural Settlements (rural-urban migration; land use changes; land acquisition and transactions),

Expected Course Outcomes:	
1	Discuss about the Settlement, Types and fundamental concepts in Settlement geography
2	Learn the concepts, characteristics and factors, Types and Patterns, Rural problem
3	Learn about the Urbanization in India and the World
4	Learn about Urban functions and characteristics, Urban Morphology
5	Study about the problem of urbanization
6	Get knowledge about the recent and future growth of smart cities.

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

TextBook(s):	
1	RY Singh, Geography of Settlement, Ravat Publications, Reprinted 2008
2	Julfikar, Hussain settlement geography.

ReferenceBook(s):	
1.	Mandal R. B (2009) Urban Geography: a text book; concept publishing Co New Delhi.

2.	Siddhartha K (2013) Cities, Urbanization and Urban Systems Kisalaya Publications New Delhi.
3.	V. N. P Sinha, Ushavarma, Anuradhasahay (2020) Introduction to settlement Geography, Raajesh publications.
4.	Chisholm. M(1967) Rural settlements and Land use Johnwiley, Newyork
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://smartcities. gov. in/

SL. NO.		PART	COURSE	Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
I SEMESTER										
5	-	Core	V-P		TECHNIQUES OF MAPPING AND MAP ANALYSIS	6	4	40	60	100

Course Objectives:

1. To introduce the concepts practically in mapping and mapanalysis
2. To understand the various aspects of map reading, interpretation and representation of various data through maps.
3. To provide a basic understanding in the field of interpretation andinterpolation.
4. To understand the theoretical and practical methods pertaining to mapmaking.
5. To understand the concepts and importance of various analysis used inmapping.

Unit - 1 MAP AND INTERPRETATION

Map appreciation and interpretation: thematic, topographic and atlas maps- mapping and analysis: Relative relief and slope maps; height and hypsometric curves; stream Analysis

Unit - 2 CLIMATE AND HYDROLOGY

Climate and Hydrology: climograph and climatograph; rainfall variability, intensity maps temperature and rainfall profiles; deviation and dispersion graph; aridity and water balance graphs

Unit - 3 POPULATION AND ECONOMIC DATA MAPPING

Population and economic data mapping: dot maps, density maps - colour and grey scale patterns; index of concentration and diversification; crop combination technique, spatial interaction, measures of transport network analysis

Unit - 4 QUANTITATIVE SYMBOLISATION AND LOCATION MAP

Quantitative symbolisation and location Maps: located representation of tourism and facilities; point and line pattern analysis; cartograms and 3D maps

Unit - 5 MAPPING AND INTERPOLATION

Choropleth and isorhythm maps - class interval selection methods – unipolar and bipolar graphs and colour patterns – interpolation methods

Unit-6 CONTEMPORARY ISSUES AND CHALLENGES

Contemporary Issues related to latest techniques of mapping and map analysis

Expected Course Outcomes:

1	Understanding the importance of various mapping techniques in geographical study	**K1, K2**
2	Understand the procedures and steps involved in the interpretation of thematic, topographic and atlas maps etc.	**K2, K3**
3	Learnthequantitativeapplicationsinvolvedinmappingandinterpolation.	**K3, K6**
4	Ability to analyze and perform analysis like network analysis, stream analysis, point and line pattern analysis.	**K4, K5**

5	Capable of creating maps based on appropriate cartographic knowledge.	**K5, K6**
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create		
Text Book(s)		
1.	Tamaskar, B. G., Deshmukh, V. M. (1974): Geographical Interpretation of Indian Topographical Maps, Orient Longman Ltd., Bombay	
2.	Lawrence, G.R.P. (1971). Cartographic Methods, Methuen & Co., Canada	
3.	Worthington, B.D.R. and Robert Gent (1975): Techniques in Map Analysis, EbenzerBaylis and Sons, USA.	
4.	Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.	
5.	Ramamurthy, K. (1982): Map Interpretation, Rex Printers, Madras	
6.	Understanding Map Projection (2003-2004): GIS by ESRI, Redlands	
7.	Chrisman, N. (1997): Exploring Geographic Information systems, John Wiley & Sons., New York	
8.	*The ESRI Guide to GIS Analysis,* by Andy Mitchell, ESRI Press, 1999, 188 pp.	
Reference Book(s)		
1.	Monkhouse,F.J.,andWilkinson,H.R.(1976):MapsandDiagrams,Metheun&Co., London.	
2.	Miller, Austin (1953): The skin of the Earth, Methuen & Co. Ltd. London	
3.	Pearson II, F. 1990. Map Projections: Theory and Applications 2nd ed, CRC Press.	
4.	Kimerling, A.J., Buckley, A.R., Muehrcke, P.C., Muehrcke, J.O. 2011. Map Use: Reading, Analysis, Interpretation, 7th ed, Esri Press.	
5.	Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed,Orient Blackswan Private Ltd.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	www.sevenoaks.wa.edu.au/linkpage/geog/copy.html	
2	http://www.esri.com/	
3	www.gisdevelopment.net/books/mapping/bmap0010.html	

SL. NO.	PART	COURSE		Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
I SEMESTER										
6		SEC	I		Skill Enhancement Course - I Seminar	2	2	25	75	100

Pre-requisite prior knowledge in Seminar (Communication and Presentation Skills)

Course Objectives:

1. To encourage the all-round development of students by focusing on softskills.
2. To make the students aware of the importance, the role and the content of soft skills through instruction, knowledge acquisition, demonstration andpractice.
3. To develop and nurture the soft skills of the students through individual and group activities.
4. To expose students to right attitudinal and behavioural aspects and to build thesame through activities

Unit - 1 ROLE OF SOFTSKILL

A course will give students the skills necessary to prepare professional materials for presentation.

Unit - 2 SCIENTIFIC METHOD OF SOFTSKILL

Topics covered in this course include: searching the scientific literature; scientific writing style, preparing scientific presentations, poster and oral presentations presentation of data using ICT; and using word processing, spreadsheet, and presentation software.

Unit - 3 WRITTEN SKILLS

Learn the art of selecting a problem and review of literature.

Unit - 4 PRESENTATION SKILL

The student will present a simple article on the basis of review of selected literature on any of the first semester subjects.

Unit - 5 ANALYSING AND REPORT WRITING

(Review and appraisal - regional geography / geospatial technology related / global issues)

Unit - 6 Contemporary Issues

Contemporary Issues and challenges

Expected Course Outcomes:

1	Understand the role of communication in personal & professional success.	**K2, K4**
2	Students will be able to understand and apply knowledge of human communication and language processes as they occur across various contexts.	**K3, K4**
3	Students will be able to understand the research methods associated with the study of human communication, and apply at least one ofthose approaches to the analysis and evaluation of human communication.	**K2, K6**

4	Actively participate in group discussion / meetings / interviews and prepare & deliver presentations	**K3, K6**
5	Students will be able to communicate effectively orally and in writing.	**K5, K6**
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create		
Text Book(s)		
1	Managing Soft Skills for Personality Development – edited by B.N.Ghosh, McGraw Hill India, 2012.	
2	English and Soft Skills – S.P.Dhanavel, Orient Blackswan India, 2010	
Reference Book(s)		
1.	Rani, E., &Mangala, S. (2010). Need and importance of soft skills in students. Journal of Literature, culture and Media studies,2(3).	
2.	Haber, R. J., & Lingard, L. A. (2001). Learning oral presentation skills. Journal of general internal medicine, 16(5), 308-314.	
3.	Csikosova, A., Senova, A., &Culkova, K. (2012). Improving of communication and presentation Skills of the universities' students through e-Learning. Procedia-Social and Behavioural Sciences, 46, 2847-2851.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://www.edx.org/learn/soft-skills	
2	https://www.goskills.com/Soft-Skills	
3	https://www.lifehack.org/785450/online-learning-sites	

SL. NO.	PART	COURSE	Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
II SEMESTER									
7	-	Core	VI	APPLIED CLIMATOLOGY	5	5	25	75	100

Course Objectives:	
1. Gaining basic knowledge about weather elements 2. Learning patterns of global wind circulation 3. Understanding world climatic classification, climate change and global warming 4. Acquiring skills in micro level climate, weather forecasting methods and weather measurement techniques 5. Demonstrate applicable solutions for climate change	
Unit – 1	**Nature and scope of applied Climat**ology- the development of applied climatology Atmosphere: Its composition (gaseous) and structure; Insolation and Radiation, heating of land and water; temperature and pressure: variations in temperature and pressure; temperature zones, heat balance, and pressure belts
Unit – 2	**Global wind circulation**: Tricellular meridional circulation; trade winds, easterlies and westerlies and polar winds; Air masses: continental and maritime; fronts and their types; clouds; precipitation: thunderstorms, cyclones (tropical and temperate) and anti-cyclones.
Unit – 3	**Climatic classifications**; Indian climates and climatic zones; micro climates, agro-climates and urban climates; urban air pollution problems- global climate change; global warming and their likely impacts on human life- El Nino, La Nino
Unit – 4	**Urban climate and global environment change** - the nature of the global environmental change, urban climates, impact of the urban climate on GEC.
Unit – 5	**Weather forecasting:** short range and long-range forecasting – weather satellites and sensors – sounding techniques – weather maps – field instruments in forecasts
Unit – 6	**Contemporary Issues** Regarding Climate Change and Solutions: Challenges to Sustainable Development

ExpectedCourseOutcomes:		
1	To recall weather elements and its importance	**K1, K2**
2	Discuss various wind around the world	**K5, K3**
3	To compare climatic classification for global and regional level	**K3, K4**
4	Apply various weather forecasting methods	**K4, K5**
5	Analysing the Characteristics of Urban Heat Island	**K5, K6**
K1 **–** Remember; K2 **–** Understand; K3 **–** Apply; K4 **–** Analyze; K5 **–** Evaluate; K6 **–** Create		

Text Book(s)	
1	Perry, Allen, and Russell Thompson. Applied climatology: principles and practice. Routledge, 2013. Thompson, R. (1997). Applied climatology: principles and practice. Psychology Press.
2	Hobbs, John E. Applied climatology: a study of atmospheric resources. Elsevier, 2016.
3	Rohli, Robert V., and Anthony J. Vega. Climatology. Jones & Bartlett Learning, 2017.
4	Khan, A., Chatterjee, S., & Wang, Y. (2020). Urban Heat Island Modeling for Tropical Climates. Elsevier.
5	Hartmann, D. L. (2015). Global physical climatology (Vol. 103). Newnes.
Reference Book(s)	
1	Ahrens, C. D. (2011). Essentials of meteorology: an invitation to the atmosphere. Cengage Learning.
2	Ahrens, C. D. (2012). Meteorology today: an introduction to weather, climate, and the environment. Cengage Learning.
3	Collins, M., An, S. I., Cai, W., Ganachaud, A., Guilyardi, E., Jin, F. F., ...& Wittenberg, A. (2010). The impact of global warming on the tropical Pacific Ocean and El Niño. Nature Geoscience, 3(6), 391-397.
4	Elizabeth Kolbert, (2006) Field Notes from A Catastrophe: Man, Nature and Climate Change, Bloomsbury Publishing Plc.
5	Howard J. Critch field (1995); General Climatology; Prentice, Hall of India Pvt. Ltd., New Delhi.
6	Huang, P., Xie, S. P., Hu, K., Huang, G., & Huang, R. (2013). Patterns of the seasonal response of tropical rainfall to global warming. Nature Geoscience
7	Kelkar, R. R. (2007). Satellite meteorology. BS Publications.
8	Kidder, S. Q., Kidder, R. M., &Haar, T. H. V. (1995). Satellite meteorology: an introduction. Gulf Professional Publishing.
9	Lisa F. Schipper and Ian Burton (Ed.) (2008) Adaptation to climate Change, Earthscan Reader Series,
10	Mather, J. R. (1974): Climatology: Fundamentals and Applications, Mc Graw Hill, New York.
11	Oliver, John E. (1973): Climate and Man's Environment: An Introduction to Applied Climatology, John Wiley & Sons, New York, London.
12	Thompson, R. D. and Allen, P. (1997): Applied Climatology: Principles and Practice, Routledge, London and New York.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://public.wmo.int/en/resources/training
2	https://metnet.imd.gov.in/phps/imdweb_imdnews.php
3	https://www.un.org/en/climatechange/speeches
4	https://www.ipcc.ch/data/
5	https://www.greenclimate.fund/publications
6	https://mausam.imd.gov.in/imd_latest/contents/satellite.php

SL. NO.	PART	COURSE	Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
II SEMESTER									
9	-	Core	VIII	**Remote Sensing and Its Applications**	5	4	25	75	100

Course Objectives:
1.Understand the purpose and importance of RS, GIS & GNSS 2.To provide background knowledge and understanding of principles of RS and GNSS Systems 3. To enhance student's capacity to interpret images and extract information on the earth surface from multi-resolution imagery at multi-scale level.
Unit – 1 Introduction to Remote Sensing
Remote Sensing Process - Analog to Digital data – Digital image data formats - Image processing system characteristics - Initial statistical extraction: histograms, univariate and multivariate statistics – Scientific visualization – Image Pre-processing: calculating radiance from DNs - atmospheric, radiometric and geometric correction.
Unit- 2 Image Enhancement
Contrast enhancement: linear, non-linear and level slicing – Spatial feature enhancement: spatial filtering, edge enhancement and Fourier and wavelet transform – multi-image enhancement – band ratioing, principal component analysis, vegetation indices, IHS and texture transformations and image fusion
Unit- 3 Image Classification:
Supervised classification: classification algorithm and training site selection - Unsupervised classification – Hybrid classification – Classification of mixed pixels: spectral mixture analysis and fuzzy classification.
Unit - Aerial &Satellite Remote Sensing
Aerial Remote Sensing: Aerial photographs: Classifications based on Camera, Film and Orientation –Photo scale - Parallax – Stereo model - Flight planning - Marginal information – Interpretation keys - LIDAR – Drone Satellite Remote Sensing - Satellite – Types, Orbits and Sensors - Resolution: types - aspects of LANDSAT, SPOT, IRS, IKONOS, QUIKBIRD and recent satellites –Marginal information and Interpretation
Unit - Applications of Remote Sensing
Applications of Microwave and Thermal Remote Sensing - Pre-processing: Rectification and Enhancements – Manipulation - Classification methods: Supervised and Unsupervised - Ground truth verification – Accuracy assessment -Vegetation Indices: VI and NDVI, Software: ERDA and ENVIS.
Unit - 6 Remote Sensing Image processing & Applications in Geography
Applications of Remote Sensing in Geography: Geomorphology, Water Resources, Disaster studies, Forestry, Agriculture, Land use and Land cover and Urban planning.

Expected Course Outcomes:		
1	Understand the basics of spatial structure of transportation network	**K2, K6**
2	Gain insights on processing methods and techniques for handling radiometric and geometric properties of remotely sensed	**K4, K5**
3	Developing data processing automation skills necessary to analyze high level remote sensing and GIS Products.	**K3, K6**
4	Familiarize with principles and methods of multi-resolutions and multi-spectral data fusion, multi- temporal processing and accuracy assessment.	**K1, K6**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

References

1	Peter A. Burrough and Rachael A. McDonnell, 2011, Principles of Geographic Information Systems, Oxford University Press.
2	Ian Heywood, Sarah Cornelius and Steve Carver, An Introduction to Geographic InformationSystem, 2010, third edition, Pearson Education Ltd.
3	David O' Sullivan and David J. Unwin, 2010, Geographic Information analysis, second edition, John Wiley & Sons.
4	Kang – Tsung Chang, 2018, Introduction to Geographical Information System, New York: McGraw-Hill Education, ISBN 9781259929649
5	Stephen R. Galati, 2006, Geographic Information Systems Demystified, ARTECH HOUSE, INC., ISBN-13: 978-1-58053-533-5.
6	Michael N. DeMers, 2009, GIS For Dummies, Wiley Publishing, Inc., ISBN: 978-0-470-23682-6
7	Bhatta, Basudeb. Remote Sensing and GIS. India, OUP India, 2011.
8	Campbell, James B. Introduction to Remote Sensing. United Kingdom, Taylor & Francis, 2002. Joseph, George. Fundamentals of Remote Sensing. India, Universities Press, 2005.
9	Digital Image Processing. India, Tata McGraw Hill Education, 2009.
10	Jain, Anil K. Fundamentals of digital image processing. India, Prentice Hall, 1989.

SL. NO.	PART	COURSE	Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
II SEMESTER									
8	-	Core	VII		**PRINCIPLES OF GIS AND GNSS**	5	5	25	75	100

Course Objectives:	
1 To identify the concepts of GIS and its various components. 2 To study the principles of GNSS and its applications	
Unit – 1	**GIS:** Map elements: Point, Line and Area – Mapping techniques – Scales – Coordinate system – Projection; GIS – Definition – Development – Components – Capabilities and Contribution disciplines of GIS.
Unit – 2	**GIS Data Structure**: Types of data: Spatial and Attribute – Representation of data: Raster and Vector – Methods of data storage: Raster and Vector data storage method – Conversion of data: Rasterization, Vectorization and Integration – Comparison of raster and vector data
Unit – 3	**Data Input and Editing**: Scanning, Digitizing, Topological, Geo-referencing, Rubber sheeting and Edge matching – Database Management System: linking spatial and attribute data
Unit – 4	**GIS Data Analysis**: Vector and Raster data analysis: Queries, Buffering, Map overlay, Boolean algorithm, Map manipulation; Cell by cell, Neighbourhood, Zonal and Distance measures; Terrain Analysis, Spatial Interpolation, Region based analysis and Network analysis – Models – Binary, Index, Regression and Process models – GIS packages: Raster and Vector based GIS packages
Unit – 5	**Global Navigation Satellite System** (GNSS) – Development of GNSS – Segments: Space, Control and User – Different names of GNSS – GNSS Receivers types based on Channels, Frequencies and Ranges – Applications of GNSS: Location, Navigation, Tracking, Mapping and Surveying – Limitations of GNSS
Unit – 6	**Ground Penetrating Radar Systems** (GPRS) – Applications – Large area mapping, Road Investigation, Archaeology, Underground storage Tank, Bedrock mapping – SPY Satellite – Applications

Programme Outcomes:		
1	Understand the mapping Techniques through GIS	
2	Familiarize with vector and raster data	
3	Understand GIS Data Input and Editing	
4	Know about the Spatial Analysis in GIS	
5	Learn about the applications of GNSS	
Programme specific outcomes		
1	Mapping symbols through software	
2	GIS Data Structure	

3	Scanning, Digitizing, Topological, Geo-referencing, Rubber sheeting and Edge matching	
4	data analysis: Queries, Buffering, Map overlay, Boolean algorithm	
5	Global Navigation Satellite System	
K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create		
Text Book(s)		
1	The Global Positioning system and GIS, Michael Kenedy	
2	Anand P. H. (2003) – Principles of Remote Sensing and GIS, Srivenkateswara Publishers, Kumbakonam	
Reference Book(s)		
1.	Anji Reddy M. (2014) – Textbook of Remote Sensing and Geographical Information Systems, BS Publications.	
2.	Kang – Sung Chang (2002) – Introduction to Geographic Information System. Tata McGraw Hill Publishing Company lit. New Delhi.	
3.	Peter A. Burrough and Rachael A. Medonnell (1998) – Principals of Geographic Information System, Oxford University Press, New York.	
Related Online Contents: [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	www. isro. gov. in and https: //www. gp – radar. com/	

SL. NO.	PART	COURSE		Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
10	-	Core	IX-P		**GEO-SPATIAL LAB**	5	4	40	60	100

Course Objectives:

1. To introduce the concepts of Geographic Information Systems practically and to understand the various aspects of map reading, design and evaluation of digital maps.
2. To understand the theoretical and practical concepts pertaining to map making.
3. To obtain a comprehensive understanding of the spatial models, applications and tools currently available in the field of GIS.
4. To apply the GIS concepts to create, analyse and interpret the spatial maps in the field of geospatial technology.
5. To suggest tools and techniques for execution of spatial operations.

Unit - 1	**Fundamentals of Mapping and Exploration**

Map exploration - Georeferencing – map projection and transformation – spatial entity creation – digitization – symbolization - attribute data editing – labelling and annotation – map design and layout - editing and topology: building topology, topology error rectification – edge matching – rubber sheeting.

Unit - 2	**Spatial Data Editing and Analysis**

Attribute data management and thematic mapping: quantitative and qualitative mapping, dot map, located pie chart and bar chart – proximity analysis – overlay analysis.

Unit - 3	**Spatial Analysis and Spatial Statistics**

Network analysis – geocoding - location and allocation models; spatial statistics: measurement- mean centre, median centre, standard distance

Unit - 4	**Terrain and Surface Analysis**

Surface analysis and Interpolation techniques: creation of contours, slope, aspect, kriging, spline, inverse distance weighted (IDW) – 3D visualization: DEM, TIN and visibility analysis.

Unit - 5	**Spatial applications and Modelling**

Multi criteria analysis and Ground truth support: GPS with field data attributes - geotagged photographs - Suitability analysis and modelling: habitat suitability – house hunting.

Unit - 6	**Contemporary Issues**

Local field observations - Group Discussions related to current issues and challenges in Geographic Information System (GIS) applications

Expected Course Outcomes:

1	A clear understanding in key concepts of cartography, GIS and the aspects in reading, designing, and evaluating digital cartographic maps	**K1, K2**

2	Understand the relationship between map projections, coordinate systems and geospatial layers including map algebra and spatial statistics.	**K2, K3**
3	Learn the skills in data collection, storage, analysis and interpretation of spatial data in GIS interface.	**K3, K6**
4	Ability to analyse and evaluate the maps and perform spatial operations like overlay analysis, landscape analysis, terrain analysis, suitability analysis and spatial modelling.	**K4, K5**
5	Create tools and models for developing and solving complex geospatial problems in GIS	**K4, K6**
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create		

SL. NO.	PART	COURSE	Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
II SEMESTER									
11		CBE	I	**DISCIPLINE SPECIFIC ELECTIVE - I TRANSPORT GEOGRAPHY**	5	3	25	75	100

Course Objectives:	
1. Understand the purpose and importance of Transportation Geography 2. Explain the spatial organization of transport systems 3. Examine the role of transportation system in energy, environment and economy 4. Discuss the modes of transportation and trade and urban transportation 5. Apply and evaluate the concepts in planning and policy for sustainable development	
Unit – 1	**Scope and significance of Transportation** Geography- basic concepts- Physical Environment and Transportation - The Emergence of Mechanized Transportation Systems- Setting of Global Transportation Systems
Unit – 2	**Geography of Transportation Networks**-Transport and Spatial Organization-Transport and Location- Information Technologies and Mobility
Unit – 3	**Transportation and Economic Development**- Transportation and Energy- Transportation and Environmental justice- Sustainability and Decarbonization -Transportation and Society- Transport Costs- Demand of Transportation Services
Unit – 4	**Road, Rail and Pipelines, Maritime and Air Transport**-Intermodal Transportation and Containerization-Transport Terminals and Hinterlands- Port, Rail and Airport Terminals- Trans-border and Cross-border Transportation- Globalization and International Trade- Freight Transportation and Value Chains- Transport hubs
Unit – 5	**Urban Land Use and Transportation**- Urban Mobility- Urban Transport Challenges-Transport Policy-Transport Planning and Governance- Transport Safety and Security- Transportation Disruptions and Resilience- Geospatial technology and spatial transport planning
Unit – 6	**Technology and Transport Infrastructure**- Governance and Management- Social and Environmental Responsibility- Future Intelligent and smart Transportation Systems

1	Analyse the transport systems and problem from a spatial perspective.	**K2, K3**
2	Assess the environment, energy and other socio-economic dimensions with reference to transportation development	**K2, K5**
3	Evaluate different modes of transportation and trade for sustainable developmental activities	**K4, K2**
4	Evaluate the role of transportation in affecting current patterns of economic development and spatial planning	**K1, K6**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create	
Text Book(s)	
1	Black, W. (2003) Transportation: A Geographical Analysis. New York: Guilford.
2	Haggett, P. (2001) Geography: A Modern Synthesis, 4th Edition, New York: Prentice Hall.
3	Jean-Paul Rodrigue (20220) The Geography of Transport System, Routledge Taylor & Francis Group,Newyork
4	Keeling, D.J. (2007) “Transportation Geography: New Directions on Well-Worn Trails”, Progress in Human Geography, 31(2), 217-225.
5	Keeling, D.J. (2008) “Transportation Geography – New Regional Mobilities”, Progress in Human Geography, Vol. 32, No. 2, pp. 275-283.
6	Knowles, R., J. Shaw and I. Docherty (eds) (2008) Transport Geographies: Mobilities, Flows and Spaces, Malden, MA: Blackwell.
Reference Book(s)	
1	Schiller, P.L., and J.R. Kenworthy (2018) An Introduction to Sustainable Transportation: Policy, Planning and Implementation, New York: Routledge
2	Tolley, R. and B. Turton (1995) Transport Systems, Policy and Planning: A Geographical Approach, Burnt Mill, Harlow, Essex: Longman.
3	Ullman, E.L. (1980) Geography as Spatial Interaction, Seattle: University of Washington Press
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://transportgeography.org/
2	https://cbpbu.ac.in/userfiles/file/2020/STUDY_MAT/GEO/null.pdf
3	https://unece.org/transport

SL. NO.	PART	COURSE	Sub-Code		COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
II SEMESTER										
12	-	NME	I		**NON-MAJOR ELECTIVE - I : GEOGRAPHY OF TAMIL NADU**	3	2	25	75	100

Course Objectives:	
1. To study the importance of physical features. 2. To understand the resources and the distribution.	
Unit – 1	Location – Administrative Divisions – Physiography – Drainage – climate – soil – natural vegetation.
Unit – 2	Irrigation: Types and its importance – Agriculture; Distribution and Production of Rice, Cotton, Sugarcane, Tea, Groundnut.
Unit – 3	Power Resources: Hydel, Thermal, Wind, Atomic, Tidal and its Distribution, Mineral resources: Bauxite, limestone, iron ore and coal.
Unit – 4	Industries: distribution and production: cotton textile, automobile, cement and leather industries, iron and steel industries
Unit – 5	Population distribution: growth, Density, literacy, sex ratio and rural and urban. Transport: Road, Railway, Airways and Water ways, Ports, Trade.
Unit – 6	Tamil Nadu million cities industries corridor. Urban corridor Renewable / Non – Renewable resources, WTO.

Expected Course Outcomes:		
1	Location of Tamil Nadu and its Physiography division.	
2	Importance of water resources and agriculture	
3	Power resources	
4	Significance of industries like cotton, automobile, cement and leather.	
5	Importance of population and trade & transport.	
6	Industries corridor Renewable / Non – Renewable resources.	
K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create		

TextBook(s):	
1	V. Kumarsamy Geography of Tamil Nadu (Tamil)
2	Dr. N. Rajalakshmi (1999) Tamil Nadu Economic published by business publication INC. Mumbai.
ReferenceBook(s):	
1.	A. G Leonard Tamil Nadu Economy (2006) Macmillan India. ltd Chennai.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://cutn. ac. in
2	http://www. kasc. ac. in

SL. NO.	PART	COURSE		Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
13		SEC	II		TECHNICAL WRITING	2	2	25	75	100

Pre-requisite	No prior knowledge in Technical Writing (Research Article/ Report/ Thesis)

Course Objectives:

1. This course is designed to develop skills that will enable to produce clear and effective scientific and technical documents
2. Understand professional writing by studying management communication contexts and genres, researching contemporary business topics, analyzing quantifiable data.
3. Learn to identify and select many types of writing frequently required in a variety of careers.

Unit - 1	**UNDERSTANDING RESEARCH WRITING**

The aim of this course is to provide students with the opportunity to improve their skills in writing a research article, report and to prepare other professional materials for presentation or publication

Unit - 2	**SCIENTIFIC WRITING SKILLS**

This course will cover review of scientific literature, scientific writing style; writing research papers, proposals

Unit - 3	**SCIENTIFIC PRESENTATIONS**

Preparing scientific presentations with data. Students will use scientific methodology or quantitative techniques

Unit - 4	**GEOSPATIAL RESEARCH**

Geospatial technology for preparing a short research paper

Unit - 5	**APPLICATION GEOSPATIAL TECHNOLOGY**

The application of geospatial technology and spatial analytical techniques will be used for writing and presenting a long research paper

Unit - 6	**CONTEMPORARY ISSUES**

Contemporary Issues and challenges

Expected Course Outcomes:

1	Students will understand and know how to follow the stages of the writing process (prewriting/writing/rewriting) and apply them to technical and workplace writing tasks.	**K2, K3**
2	Students will be able to produce a set of documents related to technology and writing in the workplace and will have improved their ability to write clearly and accurately.	**K3, K4**

3	Students will understand the basic components of definitions, descriptions, process explanations, and other common forms of technical writing.	**K2, K4**
4	Students will be familiar with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, and presentation.	**K4, K5**
5	Students will be able to read, understand, and interpret material on technology. They will have an appreciation for some of the ideas, issues, and problems involved in writing about technology and in workplace writing.	**K4, K6**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Text Book(s)

1	Young, M. (2002). The technical writer's handbook: writing with style and clarity. University Science Books.
2	Tebeaux, E. (2018). The emergence of a tradition: Technical writing in the English Renaissance, 1475-1640. Routledge.
3	Longo, B. (2000). Spurious coin: A history of science, management, and technical writing. SUNY Press.

Reference Book(s)

1	Alamin, A., & Ahmed, S. (2012). Syntactical and Punctuation Errors: An Analysis of Technical Writing of University Students Science College, Taif University, KSA. English Language Teaching, 5(5), 2-8.
2	Yu, H. (2008). Contextualize technical writing assessment to better prepare students for workplace writing: Student-centred assessment instruments. Journal of Technical Writing and Communication, 38(3), 265-284.
3	Mills, G. H., & Walter, J. A. (2018). Technical writing. Holt Rinehart and Winston.
4	Blake, G., & Bly, R. W. (1993). The elements of technical writing (p. 173). New York, NY: Macmillan.
5	Tebeaux, E. (2017). Whatever happened to technical writing.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	https://www.apress.com/gp/open-sourcehttps://courses.lumenlearning.com/atdclinton-technicalwriting/chapter/course-objectives/
2	http://homepages.rpi.edu/~zappenj/TecWriting/twco10s.html
3	https://researcheracademy.elsevier.com/writing-research/writing-skills
4	https://www.unl.edu/gradstudies/connections/twenty-steps-writing-research-article
5	https://buyresearchpapers.net/blog/research-paper-writing-skills

SL. NO.	PART	COURSE		Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
III SEMESTER										
14	-	Core	X		GEOGRAPHICAL THOUGHT	6	5	25	75	100

Course Objectives:	
1. Understand ancient scholars' contribution to geography 2. Knownexplorationanddiscoveries,HistoryofWorldCivilizationandcontributionof modern geographer to geography 3. Should be able to known dualism concept in geography, Region, regionalization and scientific explanation of deductive and inductive logic. 4. Should be able to learn quantitative revolution in geography, Paradigm shift and various new ideas and concept in geography Explain howl ocation play main role for modern politics	
Unit – 1	Nature of geography - Greek contribution to Physical geography, Human geography, Cartography, Mathematical geography - Contribution of Romans: Sytrabo, Ptolomy, PompniusMela, Lifirmanus - Arab contribution to geography - Ancient Indian Geographical Thought - Sources of information - Contribution of Indians – Geography of India, Dwipas, seasons – earth and sun
Unit – 2	Major exploration and discoveries: Contribution of Megallan, Vascodagama, James cook, Cahristopher Columbus– Contribution of modern geographyers: varenias, ImmanualKant, Alexander Von Humbolt, Carl Ritter -Determinism and Possibilism, New Determinism – Contributions of Radzel, Ellensemple, La blaches, Ellsworth, Huntington, Griffith Taylor
Unit – 3	Dualism in Geography: Systematic and regional geography: Physical and human geography- The myth and realism about dualisms – Regional Geography: Concepts of a region, regionalization and regional methods - Scientific explanations: Deductive, inductive logic; types of explanations – cogitative description – cause and effect – temporal, functional and ecological systems
Unit – 4	Theories and models in geography – quantitative revolution and paradigms - Themes in Geography – Positivism – Pragmatism – Behaviourism – functionalism – idealism – realism and Marxism
Unit – 5	Modern political ideas – Heartland concept of Halford Mackindei – Rimland Theory of Spikeman–SocialDarwinismofF.Ratzel-conceptualandmethodologicaldevelopments and changing paradigms; status of Indian Geography, Future of geography;
Unit – 6	Geography in the Face of Modern World Challenges

1	Evaluate contribution of modern geographer to geography and ability to analysis determinism and possibilism in geography	**K2,K5**
2	Assessment of dualism concept in geography	**K4,K5**
3	Apply quantitative revolution in geography	**K3,K5**
4	Discuss various theories, themes, models in geography and evaluate modern political ideas based on location	**K3,K6**

K1-Remember;K2-Understand;K3- Apply;K4-Analyze;K5-Evaluate;K6-Create	
TextBook(s)	
1	Rana,Lalita.Geographical thought.Concept PublishingCompany,2008.
2	Martin,G.J.(2005).All possible worlds: Ahistory of geographical ideas.OUP Catalogue.
3	Nayak,A.,&Jeffrey,A.(2013).Geographical thought: An introduction to ideas in human geography. Routledge.
4	Cloke,P.,&J ohnston,R.(Eds.).(2004).Spaces of Geographical Thought: Deconstructing Human Geography′ s Binaries. Sage.
ReferenceBook(s)	
1.	Johnston,R. (2018).A Student's Introduction to Geographical Thought: Theories, Philosophies, Methodologies.
2.	May,J.A.(2019).Kant's concept of geography and its relation to recent Geographical thought. University of Toronto Press.
3.	Amedee,D.,Golledge,R.G.,1975.An Introduction to the Scientific Reasoning in Geography, Random House,NewYork
4.	AnoopNayak,AlexJeffrey,2013.Geographical Thought: An Introduction to Ideas In human Geography, Routledge ublication,ISBN:1317904125,9781317904120
5	BeazleyC.R., 1949. The Dawn of Modern Geography Vol.III,NewYork.
6	FuchsR.J.,and DemkeG.J.,1977.Theoretical Problems of Geography, Ohio State Press,Ohio.
7	Haggett, P.,1966. Locational Analysis in Human Geography,NewYork.
8	HartshorneR.1959.PerspectiveandNatureofGeography",Rand McNally and Co., NewDelhi.
9	Lalita Rana,2008.Geographical thought-Concept Publishing Company, ISBN 8180695360,9788180695360
10	Mackiner H.J.,1904.The Geographical Pivot of History,Geographical Journal, Vol.23
11	Majid Husain,2015.Evolution of Geographical Thought, 6th edition-Rawat Publications, New Delhi.
Related Online Contents[MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://www.tandfonline.com/doi/full/10.1080/2325548X.2014.901849

Mapping with Programme Outcomes (MPO)*

MPO	PSO 1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	2	1	2
CO2	1	1	3	1	1
CO3	1	2	1	1	1
CO4	1	1	1	1	1
CO5	1	1	1	2	2
Map **Course Outcomes (CO)** for each Course with **Programme Specific Outcomes (PSO)** in the 3-Point scale of **1,2, 3 (Strong, Medium and Low)**					

SL. NO.	PART	COURSE		Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
III SEMESTER										
15	-	Core	XI		POLITICAL GEOGRAPHY	5	4	25	75	100

Course Objectives:

1. Understanding key concepts in political geography, geopolitics approaches and recent developments
2. Apply geographic concepts to analyze how human agency interacts with the physical environment to shape and reshape political geographic outcomes
3. AnalyzingthegeopoliticalsignificanceofIndianoceananditsimportance
4. CriticallyanalysepoliticalgeographyofcontemporaryIndiawithvariousissuesand conflicts

Unit-1	POLITICALGEOGRAPHY:NATURE,SCOPE,APPROACHESAND SCHOOLS OF THOUGHT

Nature,scopeandsubjectmatterofpoliticalgeography;politicalgeographyand geopolitics - approaches to the study of political geography, recent development in political geography; major schools of thought.

Unit-2	GEOGRAPHICELEMENTSANDTHESTATE

Geographicelementsandthestate:physicalelements;humanelements;economic elements; political geography and environment interface

Unit-3	POLITICALGEOGRAPHY:THEMES

Themes in political geography: state, nation, nation-state and nation-building, frontiers and boundaries, colonialism, decolonization, neo-colonialism, federalism and other forms of governance - The changing patterns of world powers perspectives on core-periphery concept, conflicts and cooperation.

Unit-4	GEOPOLITICALSIGNIFICANCEININDIANOCEAN

Geopolitical significance of Indian ocean: political geography of anyone of the following regions: SAARC Region, South-East Asia, West Asia, East Asia

Unit-5	POLITICALGEOGRAPHY–CONTEMPORARYINDIA

Political geography of contemporary India with special reference to: The changing political map of India, unity-diversity: centripetal & centrifugal forces; stability & instability; Interstate issues (like water disputes & riparian claims) and conflict resolutions insurgency in border states; emergence of new states; federal India: unity in diversity.

Unit-6	CONTEMPORARYISSUES

Contemporary issues

Expected Course Outcomes:

1	Developing an understanding of political geography and its influence in politics	**K1,K2**
2	Able to apply spatial analysis methods to assess physical and human environment to shape and reshape political geographic outcomes	**K3,K4**

3	Understand the themes of political geography in relation to nation, state, nation-building, frontiers and boundaries.	**K2,K3**
4	Ability to analyse critically the conflicts in India and geopolitical significance of Indian ocean and its importance	**K4,K5**
5	Ability to describe the contemporary issues, conflicts and challenges surrounding the Indian regions–SAARC, South-east Asia, West and East Asia.	**K4,K6**
K1-Remember;K2-Understand;K3- Apply;K4-Analyze;K5-Evaluate;K6-Create		
Text Book(s)		
1	Dikshit,R.D.,1999.Political geography: A Century of progress, Sage, NewDelhi.	
2	JohnR.,1982.Short:AnintroductiontoPoliticalGeographyRoutledge,London,	
3	PanikkarK.M.,1959. Geographical Factors in Indian History: 2vols. Asia Publishing House, Bombay.	
4	PoundsN.J.G.,1972.Political Geography. McGraw Hill, NewYork.	
5	Joe Painter and Alex Jeffery. 2009 Political Geography, 2nd Ed. Sage in 2009 with a reprint in 2012 (ISBN 978-1-4129-0138-3).	
Reference Book(s)		
1	Alexander,L.M.,1963.WorldPoliticalPatternsRanMcNally,Chicago,	
2	DeBlij,H.J., Glassner,1968.Martin Systematic Political Geography, John Wiley, NewYork.	
3	DeshpandeC.D., 1992. India - A Regional Interpretation Northern Book Centre, New Delhi.	
4	Dikshit,R.D.,1996.Political Geography: A Contemporary Perspective.Tata McGrawHill, NewDelhi	
5	FisherCharles A.,1968.Essays in Politica lGeography, Methuen, London	
6	Sukhwal,B.L.,1968. Modern Political Geography of India Sterling Publishers, New Delhi.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://www.opengeography.org/ch-10-political-geography.html	
2	https://www.ou.edu/faculty/T/Gary.L.Thompson/links.html	
3	https://www.journals.elsevier.com/political-geography	

SL. NO.	PART	COURSE		Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
16	-	Core	XII-P		**TERRAIN MAPPING ANALYSIS**	5	4	40	60	100

Course Objectives:

To enable the Students to evaluate the slope and morphology of landform.
To Understand climatic data.

Unit – 1	Drawing Profiles: Serial Profile – Superimposed Profile – Projected Profile – Composite Profile – Longitudinal Profile of the River(Thalweg)
Unit – 2	Slope Analysis: Went worth Method – Smith Method Robinson method – Altimetric Frequency Curve – Hypsometric Curve and Integral
Unit – 3	Morphometric Analysis: Linear Aspects; Stream Ordering Bifurcation Ratio. Stream Length Ratio and Density
Unit – 4	Areal Aspects: Drainage Shape Geometry – Circularity Ratio – Boyce Clark Method – Elongation Ratio
Unit – 5	Climatic Data Analysis-Climograph – Climatograph – Rainfall Dispersion Diagram – Water Surplus – Deficit Graph – Cyclone Tracking

Programme Outcomes:

1	Importance of relief features.	
2	Topographic conditions using with different methods.	
3	River morph metric character.	
4	Importance of relief features.	
5	Learn about the climatic data analysis	

Programme specific outcomes

1	Profiles and its types.	
2	Relief features.	
3	Morphology of rivers.	
4	Drainage pattern and types	
5	Various Climatic diagram	

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

Text Book(s)

1	Monk house, F. J., and Wilkinson, H. R., (1963): Maps and Diagrams: Their Compilation and Construction, Methuen and Co.,London.
2	SinghR. L., and Dutt, P. K., (1978): Elements of Practical Geography, Students and Friends, Allahabad

Reference Book(s)

1.	Gopal Singh, Map work and Practical Geography, Vikas Publishing House Pvt., Ltd., NewDelhi.
2.	Mishra R. P. and A. Ramesh, (2002): Fundamentals of Cartography, Concept Publishers, New Delhi
3.	Pijshkanti Saha and Partha Basu, (2010): Advanced Practical Geography, Books and Allied (P),

Related Online Contents: [MOOC, SWAYAM, NPTEL, Websites etc.]

SL. NO.	PART	COURSE		Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
III SEMESTER										
17	-	CBE	II		**DISCIPLINE SPECIFIC ELECTIVE - II HYDROLOGY AND OCEANOGRAPHY**	4	3	25	75	100

Course Objectives:

1. To Understand the stages of Hydrological cycle
2. To introduce a sound scientific knowledge of how water cycles through the Earth's atmosphere, surface and groundwater systems.
3. To Understand Significance of oceanography and hydrology in earth and atmospheric science, Configuration of the ocean floor and variation of temperature and salinity of oceans and seas.

UNIT-1 HYDROLOGIC CYCLE

Hydrological cycle and its sub-cycle; Man's interference on hydrological cycle - elements of hydrological cycle: precipitation - intensity and duration; evaporation; infiltration, surface runoff, urban flooding.

UNIT-2 CHARACTERISTICS AND FUNCTIONS OF FLUVIAL MORPHOLOGY

Drainage basin characteristics: human impact on hydrological system - morphometric analysis – fluvial process and analysis

UNIT-3 AQUIFERS AND GROUNDWATER

Ground water - occurrence and types: movement - quality and quantity measures - Principles of water balance and their application, - its relevance in crop geography; water pollution, need for water management.

UNIT-4 MORPHOLOGY OF OCEAN FLOOR

Relevance of oceanography in earth and atmospheric sciences: Surface configuration of the ocean floor, continental shelf, continental slope, abyssal plain, mid-oceanic and oceanic trenches - relief of Atlantic, Pacific and Indian oceans - distribution of temperature and salinity of oceans and seas.

UNIT-5 MOVEMENT OF OCEAN WATER

Circulation of oceanic waters: waves, tides and currents; currents of the Atlantic, Pacific and Indian oceans. Marine deposits and coral reefs; coastal environment - Oceans as storehouse of resources for the future.

UNIT-6 CONTEMPORARY CHALLENGES

Current challenges and emerging issues of ocean		
Expected Course Outcomes:		
1	Recall hydrological cycle, surface runoff and urban flooding	**K1, K2**
2	Knowledge on fluvial process and morphometry of drainage basin	**K2, K5**
3	Explain groundwater occurrence, types, movement, pollution and need for water management	**K3, K5**
4	Recall ocean waters movements, ocean deposits, coastal environment and coral reefs and discuss the global warming and Sea level rising	**K5, K6**
K1 - Remember; K2 - Understand; K3 - Apply; K4 -Analyse; K5 -Evaluate; K6 - Create		

SL. NO.	PART	COURSE		Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
III SEMESTER										
18	-	CBE	III		**DISCIPLINE SPECIFIC ELECTIVE - III GEOGRAPHY OF TAMIL NADU**	5	3	25	75	100

Course Objectives:	
1. To study the importance of physical features. 2. To understand the resources and the distribution.	
Unit – 1	**Location –** Administrative Divisions – Physiography – Drainage – climate – soil – natural vegetation.
Unit – 2	**Irrigation**: Types and its importance – Agriculture; Distribution and Production of Rice, Cotton, Sugarcane, Tea, Groundnut.
Unit – 3	**Power Resources**: Hydel, Thermal, Wind, Atomic, Tidal and its Distribution, Mineral resources: Bauxite, limestone, iron ore and coal.
Unit – 4	**Industries**: distribution and production: cotton textile, automobile, cement and leather industries, iron and steel industries
Unit – 5	**Population distribution**: growth, Density, literacy, sex ratio and rural and urban. Transport: Road, Railway, Airways and Water ways, Ports, Trade.
Unit – 6	Tamil Nadu million cities industries corridor. Urban corridor Renewable / Non – Renewable resources, WTO.

Expected Course Outcomes:		
1	Location of Tamil Nadu and its Physiography division.	
2	Importance of water resources and agriculture	
3	Power resources	
4	Significance of industries like cotton, automobile, cement and leather.	
5	Importance of population and trade & transport.	
6	Industries corridor Renewable / Non – Renewable resources.	
K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create		

TextBook(s):	
1	V. Kumarsamy Geography of Tamil Nadu (Tamil)
2	Dr. N. Rajalakshmi (1999) Tamil Nadu Economic published by business publication INC. Mumbai.
ReferenceBook(s):	
1.	A. G Leonard Tamil Nadu Economy (2006) Macmillan India. ltd Chennai.
2.	
3.	

4.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://cutn. ac. in
2	http://www. kasc. ac. in

SL. NO.	PART	COURSE	Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
III SEMESTER									
19		NME	II	NON-MAJOR ELECTIVE - II : GEOGRAPHY OF INDIA	3	2	25	75	100

Course Objectives:

1. To learn the physical setting of Indian topography and climatic condition
2. To understand soil characteristics and agriculture distribution
3. To knows population characteristics and distribution
4. To get knowledge of trades and transport systems of India
5. To study disaster zones of India

Unit - 1 PHYSICAL AND CLIMATE SETTINGS OF INDIA

Major Physiographic Regions and their Characteristics; Drainage System (Himalayan and Peninsular), Climate: Seasonal Weather Characteristics, Climatic Divisions, Indian Monsoon (mechanism and characteristics), Jet Streams and Himalayan Cryosphere.

Unit - 2 SOIL AND AGRICULTURE

Types and Distribution of Natural Resources: Soil, Vegetation, Water, Mineral and Marine Resources. Agriculture (Production, Productivity and Yield of Major Food Crops), Major Crop Regions, Regional Variations in Agricultural Development, Environmental,

Unit - 3 POPULATION CHARACTERISTICS

Population Characteristics (spatial patterns of distribution), Growth and Composition (rural-urban, age, sex, occupational, educational, ethnic and religious), Determinants of Population, Population Policies in India.

Unit - 4 TRANSPORT AND ECONOMY

Development and Patterns of Transport Networks (railways, roadways, waterways, airways and pipelines), Internal and External Trade (trend, composition and directions), Regional Development Planning in India, Globalisation and its impact on Indian Economy. Trade Policy; Export processing zones; Developments in communication and information technology and their impacts on economy and society; Indian space programme.

Unit - 5 NATURA DISASTER

Natural Disasters in India (Earthquake, Drought, Flood, Cyclone, Tsunami, Himalayan Highland Hazards and Disasters.

Unit - 6 CONTEMPORARY ISSUES

Space relationship of India with neighbouring countries; Regional disparities in economic development; Concept of sustainable growth and development; Environmental awareness; Linkage of rivers; Globalisation and Indian economy.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the physical, cultural, economic, and	**K1, K2**

	demographic aspects with reference to India and pursue it for further research.	
2	To analysis soil types and variation of vegetation	**K2, K3**
3	Acquaint with the distinctiveness of geographic regions as the field of learning in Geographical studies	**K3, K6**
4	To evaluate various transport network system of India	**K4, K5**
5	To apply sustainable concept to natural resource	**K4, K6**
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create		
Text Book(s)		
1	Deshpande, C.D. (1992). India – A Regional Interpretation. , New Delhi, ICSSR and Northern Book Centre	
2	Nag, P., &Sengupta, S. (1992). Geography of India. Concept Publishing Company.	
3	R.L. Singh (1989) India: A Regional Geography. Delhi: UBSPD,	
4	Sen Gupta, P. and Sdaysuk, Galina. (1968). Economic Regionalisation of India –Problems Approaches, Monograph No.8, New Delhi: Census Commissioner, Govt. of India	
5	Spate, O.H.K (1967) India and Pakistan, (3rd edition) London: Methuen	
6	Kapur, Anu. Indian Geography: A Future with a Difference. Allied Publishers, 1998.	
7	Marg, Bahadur Shah Zafar. "INDIAN GEOGRAPHY."	
Reference Book(s)		
1.	Oldham, R. D. (1894). The evolution of Indian Geography. The Geographical Journal, 3(3), 169-192.	
2.	Raza, M., & Aggarwal, Y. (1986). Transport geography of India: commodity flows and the regional structure of the Indian economy. Concept Publishing Company.	
3.	Lee, C. J. (2013). The Indian Ocean during the Cold War: Thinking through a Critical Geography. History Compass, 11(7), 524-530.	
4.	Kapur, A. (2004). Geography in India: A languishing social science. Economic and Political Weekly, 4187-4195.	
5.	Singh, S. (2007). Indian Geography. Murari Lal & Sons.	
6.	Sutton, I. (1991). Preface to Indian country: geography and law. American Indian Culture and Research Journal, 15(2), 3-36.	
7.	Jennings, Ken. (2011). Map head: Charting the Wide, Weird World of Geography Wonks. New York: Scribner	
8.	MacEachren, Alan, M., (1995). How Maps Work, Representation, Visualization and Design, Guilford Press	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://www.india.gov.in/india-glance/profile	
2	https://www.jstor.org/stable/1773463	
3	https://www.nature.com/articles/001413a0	

4	https://asiasociety.org/education/india-geographic-sketch
5	https://www.insightsonindia.com/indian-geography//

Mapping with Programme Outcomes (MPO)*

MPO	PSO 1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	2	1	2
CO2	1	1	3	1	1
CO3	1	2	1	1	1
CO4	1	1	1	1	1
CO5	1	1	1	2	2

Map **Course Outcomes (CO)** foreach Course with **Programme Specific Outcomes (PSO)** in the 3-Point scale of **1,2, 3 (Strong, Medium and Low)**

SL. NO.	PART	COURSE	Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
III SEMESTER									
20		SEC III		Skill Enhancement Course – III Mapping of Geodata base	2	2	25	75	100

Course Objectives:	
1. To Describe the maps and its types 2. To explain map elements and representation 3. To discuss the types of GIS data structure 4. To observe geographical details through PRA 5. GIS software	
Unit - 1	
Maps and GIS: definition of map, types of map,	
Unit - 2	
GIS: Map elements: Point, Line and Area – representation	
Unit - 3	
GIS Data Structure: DBMS ,Types of data: Spatial, Attribute and Non-spatial data	
Unit - 4	
Participatory Resource Appraisal (PRA)– Observation of physical and cultural details from field, Social mapping.	
Unit - 5	
Software: vector (Arc GIS, Map Info and Q GIS) and raster (ERADAS and ENVI)based	
Unit - 6	

Expected Course Outcomes:		
1	Students will understand maps	**K1, K2**
2	Students will learn map frame work for representation symbols of maps	**K2,**

		K3
3	The student will get familiarised with the data	**K3, K6**
4	students can act as Community development	**K4, K5**
5	Will help students using Software's	**K4, K6**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Text Book(s)

1.	The Global Positioning system and GIS, Michael Kenedy
2.	Anand P. H. (2003) – Principles of Remote Sensing and GIS, Srivenkateswara Publishers, Kumbakonam

Reference Book(s)

1.	Peter A. Burrough and Rachael A. McDonnell, 2011, Principles of Geographic Information Systems, Oxford University Press.
2.	Anji Reddy M. (2014) – Textbook of Remote Sensing and Geographical Information Systems, BS Publications.
3.	Kang – Tsung Chang, 2018, Introduction to Geographical Information System, New York: McGraw-Hill Education, ISBN 9781259929649
4.	Narayanasamy N, 2008, Participatory Rural Appraisal: Principles, Methods and Application,Sage India, First Edition.
5.	Prahlad Mishra 2004,Participatory Rural Appraisal (PRA): Issues and Application, SSDN Publishers & Distributors.

Mapping with Programme Outcomes (MPO)*

MPO	PSO 1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	2	1	2
CO2	1	1	3	1	1
CO3	1	2	1	1	1
CO4	1	1	1	1	1
CO5	1	1	1	2	2

Map **Course Outcomes (CO)** foreach Course with **Programme Specific Outcomes (PSO)** in the 3-Point scale of **1,2, 3 (Strong, Medium and Low)**

SL. NO.	PART	COURSE		Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
IV SEMESTER										
21	-	Core	XIII		**GEOGRAPHY OF INDIA**	6	4	25	75	100

Course Objectives:	
To Understand the Physical characteristic of the features To know about various resources in India	
Unit – 1	**India**: Location Physical division's and its characteristics**.** Climate – Soil: Characteristics Distribution Soil Erosion and Conservation**.**
Unit – 2	**Natural vegetation**: Classification and Types – River systems Northern and Southern Rivers disputes – Irrigation Types – Multipurpose River projects – Agriculture production: Food Crops**,** Commercial Crops**,** Beverage Crops and Horticulture – Agriculture Regionalization – Agricultural problems**.**
Unit – 3	**Distribution and production**: **Mineral Resources**: – Iron ore**,** Mica**,** Copper**,** Uranium Fuel resources: Coal**,** Petroleum**,** Natural Gas**,** Hydel**,** Non – conventional Power Resources: – Solar and wind**.** Industrial Development Factors of Location Types of Industries Distribution and production of major Industries Iron and steel Industries Cotton Textiles Sugar Industries Automobiles Ship Building Industries – Recent developments**.**
Unit – 4	**Transportation**: Roadways Types Railways and Water Ways and their distribution and Economic importance problems in the Water transportation – Ports – Classification – Distribution – Hinterland**.**
Unit – 5	**Population growth** – Distribution – Attributes: density Birth rate**,** Death rate**,** Sex ratio Age structure Population problems and solution**.** Trade Pattern Characteristics Trend of Trade Policies of India
Unit – 6	**Racial and Ethnic** Density in India – Globalization and Indian Economy**.**

Expected Course Outcomes:		
1	India location – physical divisions' climate soil**.**	
2	Natural vegetation – River systems – rivers disputes – Irrigation – Multipurpose projects**.**	
3	Distribution and Production: Mineral resources**,** Power resources**,** Major industries**.**	
4	Transportation: Roadways**,** Railways and Waterways**.**	
5	Population Growth – Distribution Birth rate**,** Death rate – Population problems and Solution Trend Trade policies of India**.**	
6	India location – physical divisions' climate soil**.**	
K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create		
TextBook(s):		
1		
2		

ReferenceBook(s):	
1.	Economic and Commercial Geography of India – C. P. Mamoria
2.	Economic and Commercial Geography of India – Sharma
3.	A comprehensive geography of India – Khullar.
4.	MajidHusain – Geography of India – 6th Edition, McGraw Hill Education – New Delhi.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	
2	
3	

SL. NO.	PART	COURSE		Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
22	-	Core	XIV-P		QUANTITATIVE TECHNIQUES IN GEOGRAPHY	5	4	40	60	100

Course Objectives:

1. To introduce basic statistical procedures to the students
2. To indicate the assumptions, limitations and interpretation of these procedures and results
3. To train the students to handle these statistics towards analysing the geographical problems.
4. To understand the Statistical Techniques, Numerical data in Geography
5. To familiarize about Probabilistic Treatment, Parametric Statistics and Regression Analysis

Unit - 1	Statistics, Geography and Statistics

Significance of Statistics in geographical studies; Types of Data; levels of data measurement. Sampling: basic concepts, sample UNITs and design, sampling frame and procedures, standard error and sample size, testing the adequacy of samples

Unit - 2	Measures of Central Tendency and their significance

Centro graphic techniques: mean centre, median centre and standard distance. Measures of dispersion and concentration: Range, quartile deviation, mean deviation, standard deviation; coefficient of variation, Lorenz Curve and Gini's Coefficient; location Quotient.

Unit - 3	Bivariate Analysis

Forms of relation and measuring the strength of association and relation-construction and meanings of scatter diagram; Spearman's Rank Difference and Karl Pearson's Product Moment Correlation Coefficients

Unit - 4	Regression analysis

Regression equations, construction of regression lineinterpolation, prediction, explanation; residual-statistical tests of significance of the estimates; computation of residuals and mapping.

Unit - 5	Hypothesis Testing

Needs and types of hypotheses-goodness of fit and significance and confidence levels-parametric and non-parametric procedures: contingency tables, Chi-square test, t -test, Mann-Whitney U test, Analysis of Variance (ANOVA).

Unit - 6	CONTEMPORARY ISSUES

Multivariate statistical method applications to spatial problems. Linear and non-linear correlation; regression, factor analysis, cluster analysis; spatial statistics including: trend surfaces, sequences, point distributions.

Expected Course Outcomes:		
1	Explain the role of quantitative information in geographic research and applications.	**K2, K1**
2	Demonstrate an understanding of basic descriptive statistics and regression methods as they apply to problem solving in Geography.	**K2, K4**
3	Evaluate the roles of probability theory and sampling distributions in drawing inferences about populations based on samples	**K3, K5**
4	Perform basic data manipulation, statistical calculations and graphical presentation by hand, and using computer spreadsheets or statistical software (e.g., Excel, SPSS).	**K4, K6**
5	Acquired skills to assemble, collect and manage big data resources so that they facilitate both statistical as well as geographical studies.	**K3, K6**
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create		

Reference Book(s)	
1	David M. Smith (1975), Patterns in Human Geography, Penguin, Harmons worth.
2	David U (1981), Introductory Spatial Analysis, Methuen, London.
3	Ebdon, D. (1983), Statistics in Geography: A Practical Approach, Blackwell, London.
4	Gupta, S.P. (2010), Statistical Methods, Sultan Chand and Sons, Latest Edition.
5	Hammond, R. and McCullagh, P.S. (1974), Quantitative Techniques in Geography: An Introduction, Clarendan Press, Oxford.
6	Peter a. Rogerson (2015), statistical methods for geography: a student's guide, sage publications ltd, London, United Kingdom.
7	Mathews, J.A. (1987), Quantitative and Statistical Approaches to Geography
8	Haggett, P., Andrew D. C., & Allan F. (1977), Location Methods, Vols. I and II, Edwar Arnold, London
9	Ashissarkar, (2013), quantitative geography: tech. & presentations orient blackswan private

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://swayam.gov.in/course/266-quantitative-methods
2	http://www.sethspielman.org/courses/geog5023/
3	https://www.colorado.edu/geography/class_homepages/geog_4023_s08/

4	http://www.oxfordbibliographies.com/view/document/obo 9780199874002/obo-9780199874002-0053.xml
5	https://searchworks.stanford.edu/view/923805

Mapping with Programme Outcomes (MPO)*					
MPO	**PSO 1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	1	1	2	1	2
CO2	1	1	3	1	1
CO3	1	2	1	1	1
CO4	1	1	1	1	1
CO5	1	1	1	2	2
Map **Course Outcomes (CO)** for each Course with **Programme Specific Outcomes (PSO)** in the 3-Point scale of **1,2, 3 (Strong, Medium and Low)**					

SL. NO.	PART	COURSE		Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
IV SEMESTER										
23	-	CBE	IV		DISCIPLINE SPECIFIC ELECTIVE - IV REGIONAL PLANNING	5	3	25	75	100

Course Objectives:	
1. To explain the basic concepts and approaches of regional planning. 2. To understand the regional planning & Development in India.	
Unit – 1	**Concept of a Region**, Types of regions – methods of regionalisation – Delineation methods – Regional Imbalances – Regional development strategies – Regional disparities: causes and consequences.
Unit – 2	**Geography and Regional Planning**: Concept, Principles and Objectives – Regional Approaches – Processing Techniques – Types: Sectoral, Spatial, Decentralized planning – Difficulties for planning – Regional Hierarchy: Macro, Meso and Micro levels – Current Status of Regional Planning.
Unit – 3	**Regional Development**: Process, Factors Controlling, Indicators, Measurement of Regional Disparities, Strategies for Development, Strategies for India's Development, Planning Regions of India – Five years Planning of India.
Unit – 4	**Theories of Regional Development and Application Techniques**: Industrial Location Theory view of Webber and A. Losch, – Growth Pole Theory – Role of the information through Geo-informatics for regional planning and development.
Unit – 5	**Regional Development and Planning Application**: Integrated Rural Development Programmes; Panchayat Raj and decentralised planning – Command area development Programme – Watershed management – Hill Area Development – Tribe Development Planning.
Unit – 6	**Town and Country Planning** – Integrated Area Development Planning (IADP) – Multilevel planning– Environmental Impact Assessment – Resource Mapping for Planning.
Programme Outcomes:	
1	Students know about the fundamental concept of Region.
2	Assess different aspects of regional planning
3	They know about the regional development.
4	Students know about the applicable theories of regional planning and development.
5	Student understand the application in regional planning and development
Programme specific outcomes	
1	Regional disparities, regions
2	Micro, meso and macro, current status of planning
3	Theories related to planning
4	Development programs

5	EIA, Resource mapping
K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create	
Text Book(s)	
1	Chandna. R. C (2004), Regional planning and development, Kalyani Publishers, Ludhiana
2	Kullar, D. R (2012), India, A Comprehensive Geography, Kalyani Publishers, Ludhiana.
Reference Book(s)	
1.	Laxmidevi (1997) Planning Development and Regional Deisparities, Anmol Publication Pvt.Ltd., New Delhi.
2.	Mahesh Chand and Viney K. Puri (1985)n Regional Planning in India, Allied Publishers Pvt.Ltd., Bombay
3.	Mishra R. P. (1979) Regional Planning and National Development, Vikas Publishing House Pvt.Ltd., New Delhi.
4.	Mishra RP (1969) Regional Planning Concepts Techniques Policies and case studies, Prasaranga, The Mysore University, Mysore.
Related Online Contents: [MOOC, SWAYAM, NPTEL, Websites etc.]	

SL. NO.	PART	COURSE		Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
IV SEMESTER										
24	-	SEC	IV		SKILL ENHANCEMENT COURSE - IV RESEARCH METHODOLOGY IN GEOGRAPHY	2	2	25	75	100

Course Objectives:

1. Known to identify research problem and planning for research design
2. learn project planning and management and also design, implementation, monitoring and testing of project
3. Learn data collection methods, class intervals and various statistical analysis software and techniques for research
4. Develop skill for Hypothesis Testing in research Methodology and able to use various statistical software for hypothesis testing
5. Understand steps for writing and publishing a research report and manuscript editing.

Unit - 1 **Research in Geography**

Research Recent in Geography, Meaning – Need for Scientific Research – Types of Research Approaches to Geographical Research: Identification of Fields,

Unit - 2 Logic in Research

Logic in Research: Hypotheses, Concepts and Facts, Principles, Laws and Theory and Their Implications in Geographical Research – Role of Models.

Unit - 3 **Data Analysis**

Data Acquisition and Analysis: Collection of Data – Source of Data: Primary and Secondary, Sampling Techniques, Structuring Database – Data Transformation – Simple Quantitative Techniques in Analysis of Data: Correlation, Simple Regression, Chi – Square.

Unit - 4 **Testing**

Research Design: Literature Survey, Selection of the Topic – Statement of the problem – Formulation of Hypotheses, Testing of Hypotheses – Time Schedule, Bibliography – Role of Internet,

Unit - 5 **Report Writing and Publishing**

Report Writing: Organization of the Thesis, Thesis Writing Styles, Formats, Literature Review and Appraisal, Reference Materials- Selection of Writing and Reference Citing Styles, Drafting of Thesis, Thesis Editing – Writing of Abstracts, Reports.

Unit - 6	Contemporary Issues	
Contemporary updates project management		
Expected Course Outcomes:		
On the successful completion of the course, student will be able to:		
1	Recall identification of research problem and develop research design	**K1, K2**
2	Apply bibliographic tools in research and use various writing style manual	**K2, K3**
3	Plan for data collection and construct class intervals method to classify the data	**K3, K4**
4	Develop skill for use various statistical software for hypothesis testing	**K4, K5**
5	Prepared for writing and publishing a research report and manuscript editing, Apply new techniques and use different research tools	**K4, K6**
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create		
Text Book(s)		
1	Smith, P. G., & Merritt, G. M. (2020). Proactive risk management: Controlling uncertainty in product development. productivity press.	
2	Kothari, Chakravanti Rajagopalachari. Research methodology: Methods and techniques. New Age International, 2004.	
3	Kumar Ranjit (2011). 'Research Methodology a step-by-step guide for beginners', New Delhi: SAGE Publication India Limited.	
4	Meredith, J. R., Shafer, S. M., & Mantel Jr, S. J. (2017). Project management: a strategic managerial approach. John Wiley & Sons.	
5	Marchewka, J. T. (2016). Information technology project management: Providing measurable organizational value. John Wiley & Sons.	
Reference Book(s)		
1.	Verma, S. P. Practical approach to research methodology. Akansha Publishing House, 2005.	
2.	Goddard, Wayne, and Stuart Melville. Research methodology: An introduction. Juta and Company Ltd, 2004.	
3.	Singh, Yogesh Kumar. Fundamental of research methodology and statistics. New Age International, 2006.	
4.	Gast, David L. Single subject research methodology in behavioral sciences: Applications in special education and behavioral sciences. Routledge, 2009.	
5.	Layton, M. C., Ostermiller, S. J., & Kynaston, D. J. (2020). Agile project management for dummies. John Wiley & Sons.	

SL. NO.	PART	COURSE		Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
IV SEMESTER										
25		EA			Extension Activity Field Work	-	1	25	75	100

Leaning Objectives:

1. The Objective of the course is to provide an opportunity to the students with the understanding of ground reality of a specific chosen Geographical area by observation, and learn field survey techniques. Learning Outcomes:
2. Students would be able to understand the basic socio-economic characteristics of the chosen area through the field methods/ techniques and build the capability of writing a report.

Unit I **Field Work in Geographical studies- Role, Value and Ethics**; Field techniques- Merits and Demerits;

Unit II **Source of Data**- Primary and Secondary;

Unit III **Collection of data**: methods of primary data collection- Observation method, interview method, through questionnaire, through schedule and other methods; Questionnaire and Schedule;

Unit IV **Processing and analysis of data**;

Unit V **Field Work and Report writing**: Identification of research problem; data collection through field visit; Preparing research design- aims and objectives, methodology, analysis, interpretation and writing of report.

Note-1:

1. The students shall conduct physical/socio-economic survey in the area as decided by the department under the supervision of a faculty member (s) of the department.
2. 2. A group of 15 students will prepare a report based on primary and secondary data collected during field work.
3. 3. The duration of the field work should not exceed ten days.
4. 4. One copy of the report on A-4 size paper should be submitted in soft binding.

Note-2:

The question paper of Lab work test shall contain three questions in all. Candidate(s) are required to attempt two questions in all. All questions carry equal mark

Recommended Readings:

1. Ahuja, Ram (2003), Social Survey and Research (Hindi version), Rawat Publications, Jaipur.

2. Basotia, G. R. and Sharma, K. K. (2002), Research Methodology, Mangal Deep Publications, Jaipur.

3. Creswell J. (1994), Research Design: Qualitative and Quantitative Approaches, Sage Publications.

4. Dikshit, R. D.(2003), The Art and Science of Geography: Integrated Readings, Prentice- Hall of India, New Delhi.

5. Evans M. (1988), “Participant Observation: The Researcher as Research Tool” in Qualitative Methods in Human Geography, eds. J. Eyles and D. Smith, Polity.

6. Gideon Sjoberg and Roger Nett (1992), A Methodology for Social Research, Rawat Publications,Jaipur.

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SL. NO.	PART	COURSE	Sub-Code	COURSE TITLE	Hrs.	Credits	CIA	Sem. Exam	Total
26		Project		Project	12	4	25	75	100

M.Sc., Applied Geography 2023-24 Onwards

PROJECT WORK (Code:)

1. In the IVth semester 12 hours per week have been allotted as per the course structure.

2. The students have to submit an individual project report by selecting a specific topic in Geography and allied fields by means field work and field techniques.

3. The project work should be based on either primary data or secondary data or both as required.

4. The project report should be between 20 and 25 pages.

5. Sufficient maps, diagrams and graphs with precise interpretation are the mandatory components of the project report.

6. The project report should be divided as:

I. Problem and Procedure

II. Aims and Objectives

III. Review of Literature

IV. Data and Techniques used

V. Result and discussion

VI. Summary and Conclusion VII. References

7. Evaluation and Viva -Voce: Candidates have been evaluated individually by means of viva-voce exam using the following marking pattern both by Internal and External Examiners. The average mark has been taken into account for the award of mark for the project.

Sl.No	Area of Work	Maximum Marks
1	Plan of the Project	10

2	Execution of the Plan / Collection of Data / Organization of Materials / Application of Tools / Experiment / Study / Hypothesis Testing etc., and Presentation of Report	50
2	Individual Initiative	20
4	Viva – Voce Performance	20
	Total Marks	100