

Geography MA/MSc Syllabus 2024

Bodoland University

As per NEP 2020 guidelines

Total papers:	20 Twenty
Theory papers:	16 (Sixteen)
Practical papers:	04 (Four)
Total Credit:	80 (Eighty)



Department of Geography
Bodoland University
Kokrajhar, 2023

Course Structure

Semester I

Paper code	Paper Name	Credits	L – T – P	Internal	External	Marks
GEOADL 14014	Advanced Climatology	4	4-0-0	30	70	100
GEOADL 14024	Applied Cartographic & Quantitative Techniques	4	4-0-0	30	70	100
GEOADL 14034	Computational tools for Geography Dissertation Writing	4	4-0-0	30	70	100
GEOADL 14044	Research Methodology in Geography	4	4-0-0	30	70	100
GEOADL 14054	Practical	4	0-0-4	30	70	100

Semester II

Paper code	Specialization			Credits	L–T–P	Internal	External	Marks
	Geomorphology	Social Geography	Population Geography					
GEOADL 14064	Geography of Northeast India	Geography of Northeast India	Geography of Northeast India	4	4-0-0	30	70	100
GEOSPL 15074	Advanced Remote Sensing and GIS	Advanced Remote Sensing and GIS	Advanced Remote Sensing and GIS	4	4-0-0	30	70	100
GEOSPL 15084	Advanced Geomorphology	Social Geography	Fertility Studies	4	4-0-0	30	70	100
GEOSPL 15094	Environmental Geomorphology	Geography of Culture	Mortality Studies	4	4-0-0	30	70	100
GEOSPL 15104	Practical-II	Practical-II	Practical -II	4	0-0-4	30	70	100

Semester III

Paper code	Specialization			Credits	L-T-P	Internal	External	Marks
	Geomorphology	Social Geography	Population Geography					
GEOSPL 25014	Settlement Geography	Settlement Geography	Settlement Geography	4	4-0-0	30	70	100
GEOSPL 25024	Tectonic Geomorphology	Social dynamics and Change	Migration Studies	4	4-0-0	30	70	100
GEOSPL 25034	Climatic Geomorphology	Geography of Social Well Being	Forced Migration Studies	4	4-0-0	30	70	100
GEOSPL 25044	Fluvial Geomorphology	Population and Resource Interface	Population and Resource Interface	4	4-0-0	30	70	100
GEOSPL 25054	Practical – III	Practical - III	Practical - III	4	0-0-4	30	70	100

Semester IV

Paper code	Specialization			Credits	L-T-P	Internal	External	Marks
	Geomorphology	Social Geography	Population Geography					
GEOSPL 25064	Environment & Sustainable Development	Environment & Sustainable Development	Environment & Sustainable Development	4	4-0-0	30	70	100
GEOSPL 25074	River Health	Health Geography	Health Geography	4	4-0-0	30	70	100
GEOSPL 25084	Anthropogenic Geomorphology	Gender Geography	Gender Geography	4	4-0-0	30	70	100
GEOSPL 25094	Watershed Management	Tribal Geography	Tribal Geography	4	4-0-0	30	70	100
GEOSPL 25104	Practical-IV	Practical-IV	Practical-IV	4	0-0-4	30	70	100

Example for Code: GEOADL14014

GEO: Subject code

1 – Year

01 – Sequence of paper (Paper Number)

ADL: Advanced level learning

4 – Level

4 – Credit

Paper Title: Advanced Climatology

Paper code: GEOADL14014

Credit: 4

Marks: 100

Course Objectives:

- Develop a thorough understanding of the Earth's energy budget, atmospheric composition, and the factors that control global and local climate patterns. This includes an analysis of solar radiation, greenhouse effects, and the distribution of heat and temperature.
- Equip students with the skills to analyze atmospheric moisture processes, cloud formation, precipitation characteristics, and atmospheric motion. This includes understanding climate models, sources for forecasting, and the impacts of climate change.

Course Outcomes:

- Understand Atmospheric Composition and Energy Budget
- Analyze Heat and Temperature Distribution
- Evaluate Atmospheric Moisture Processes
- Understand and Predict Atmospheric Motion
- Examine Tropical Disturbances and Climate Phenomena
- Apply Climate Classification Systems
- Develop Climate Models and Forecasting Skills

Unit I: Global Energy Budget

Atmospheric Composition: Variation of with height, latitudes, seasons and time

Factors controlling Global energy budget: Effect of solar radiation, Surface receipt of solar radiation, Terrestrial infra-red radiation and the Greenhouse effect

Heat budget of the earth: Horizontal transport of heat and spatial pattern of the heat components

Factors controlling horizontal and vertical distribution of global temperature

Surface Pressure condition of rotating non-homogenous earth, Oscillation of pressure belt

Unit II: Atmospheric Moisture Budget

Evaporation: process and factors affecting rate of evaporation, Moisture transport

Condensation: Adiabatic Temperature Changes, condensation level, air stability and instability

Cloud formation: condensation nuclei coalescence theories, solid precipitation, global cloud cover

Precipitation Characteristics: Types, Rainfall intensity, areal extent of rainstorm, frequency of rainstorm, drought

Development of Thunderstorms

Frontogenesis: Zones of wave development, frontal cyclones, non-frontal depressions

Mesoscale convective systems

Unit III: Atmospheric Motion and Tropical Climate

Vertical variation of pressure systems: Mean upper-air pattern and upper wind condition

Atmospheric motion: Divergence, vertical motion and vorticity

Global wind pattern: Departure from idealised circulation pattern, circulation pattern in vertical and horizontal planes

Local winds: Mountain and valley winds, land and sea breezes, winds due to topographic barriers

Tropical Disturbances: waves, cyclones, tropical cloud clusters

The Asian Monsoon

El Nino-Southern Oscillation Events

Climate Classification: Energy and Moisture Budget Classification, Genetic Classification

Unit IV: Climate and Weather Prediction

Fundamentals of Global Climate Models and model simulations

Data sources for forecasting

Climate Change: Climate Forcings and Feedbacks

The climatic Records

Causes of Climate change

Model strategies for prediction of climate change

Impacts of Climate Change

Reading List:

Barry, R.G. and Chorley, R.J., 2003: Atmosphere, Weather and CLimate, Routledge, London and New York

Barry R. G. and Carleton A. M., 2001: Synoptic and Dynamic Climatoloxgy, Routledge,UK.

Critchfield H. J., 1987: General Climatology, Prentice-Hall of India,New Delhi

Lal, D.S., 2023: Climatology, Sharda Pustak Bhawan, Prayagraj.

Lal, D.S., 2017: Oceanography, Sharda Pustak Bhawan, Prayagraj.

Lutgens F. K., Tarbuck E. J. and Tasa D., 2009: The Atmosphere: An Introduction toMeteorology, Prentice-Hall, Englewood Cliffs, NewJersey.

Oliver J. E. and Hidore J. J., 2002: Climatology: An Atmospheric Science, PearsonEducation, NewDelhi.

Trewartha G.T. and Horne L.H.,1980: An Introduction to Climate, McGraw-Hill.

Paper Title: Applied Cartographic and Quantitative Techniques

Paper code: GEOADL14024

Credit: 4

Marks: 100

Course objectives:

- Equip students with foundational knowledge and practical skills in cartography, including map reading, design, and the use of various cartographic tools and techniques.
- Introduce students to quantitative techniques, enabling them to analyze and interpret geographical data using uni-variate and bi-variate statistical methods.

Course Outcomes:

- Understand Basic Cartographic Concepts
- Apply Map Enlargement and Reduction Techniques
- Read and Interpret Topographical Maps
- Master Surveying Techniques
- Design Effective Maps
- Utilize Uni-variate Statistical Techniques
- Conduct Bi-variate Statistical Analysis

Unit I: Fundamentals of Cartography

Meaning of cartography, Types of Diagrams, Graphs, Distribution maps and cartograms

Concept of Bearing: Magnetic and true, whole-circle and reduced
Enlargement and Reduction: Principle of Map enlargement and reduction by Graphical and Instrumental Methods
Topographical maps: Index system, Grid reference, Map reading Component of topographical map-scale, direction, symbols, coordinates, direction, distance Identification of land forms

Unit II: Surveying and cartographic Techniques

Ground Survey and Positioning: Principles of Surveying, Measurement Technology
Traditional and Automated Survey Methods
Spherical trigonometry: Concept and Use in Cartography
Digital Planimeter: Principles of working and application of the instrument
Cartographic Design: Objectives of map design, Scope of design, Perceptual Considerations, Graphic communication, Controls on map design, Design Planning
Colour theory and Models: Nature of colour, Colour dimensions, Nature of colour vision, color modeling systems and Computer electronic display colour
Selection and Generalization Principles
Symolization of map: Feature attributes at Points, Lines and Areas

Unit III: Uni-variate statistical techniques

Need and use of quantitative techniques in geography
Graphical representation of data
Measures of central tendency: properties, merits, demerits, and uses
Measure of dispersion: Range, interquartile range, and standard deviation

Unit IV: Bi-variate statistical techniques

Testing of Hypothesis: Chi-Square Test
t – test, F – test, Z – test
Correlation: Pearson's product moment correlation coefficient, Spearman's rank correlation coefficient, and Kendal's tau
Regression: Linear Regression

Suggested Readings:

Campbell, J. (1984). *Introductory Cartography*. Prentice Hall.
Cuff, J. D. and M. M. T. (1982). *Thematic Maps: Their Design and Production*. Methuen Young Books.
Dent, B. D., T. J. S. and H. T. W. (2008). *Cartography: Thematic Map Design* (6th ed.). McGraw Hill Higher Education.
Downie, N.M. and Heath, R.W. (1970). *Basic Statistics Methods*, Third Edition. Harper International Edition.
Gupta, K. K. and T. V. C. (1992). *Working with Maps*. Survey of India, DST.
Kellaway, G. P. (1946). *Map Projections*. Methuen & Company.
King, J. P. C. and C. A. M. (1968). *Quantitative Geography*. London: John Wiley.
Koutsoyiannis. (1973). *Theory of Econometrics*. London: Mcmillan.
Kraak, M. J. and O. F. (2003). *Cartography: Visualization of Geo-Spatial Data*. Prentice Hall.
Lawrence, G. R. P. (1964). *Cartographic Methods*. Oxford University Press.
Mahmood, A. (2021). *Statistical Methods in Geographical Studies*. Rajesh Publications: N Delhi.

- Mishra, R. P. and R. A. (1989). *Fundamentals of Cartography*. Concept.
- Mishra, R. P. and R. A. (1989). *Fundamentals of Cartography*. Concept.
- Monkhouse, F. J. and W. H. R. (1989). *Maps and Diagrams*. B.I. Publication Pvt. Ltd.
- Peter Haggett, Andrew D. Cliff, & A. F. (1977). *Vocation Methods Vol. I and II*. London: Edward Arnold.
- Robinson, A. H. et. al. (1995). *Elements of Cartography* (6th ed.). John Wiley & Sons.
- Rogerson, Peter A. (2001). *Statistical Methods for Geography*. Sage Publications.
- Sarkar, A. (2015). *Practical Geography: A Systematic Approach*. Orient Blackswan Private Ltd.
- Sharma, J. P. (2010). *Prayogic Bhugol*. Rastogi Publishers.
- Shaw, G. and Wheeler, D. (1985). *Statistical Techniques in Geographical Analysis*. John Wiley & Sons.
- Singh, L. R. and S. R. (1977). *Manchitra Tatha Prayogaatmak Bhugol*. Central Book, Depot.
- Singh, R. L. and S. R. P. B. (1999). *Elements of Practical Geography*. Kalyani Publisher.
- Slocum, T. A., M. R. B. and K. F. C. (2008). *Thematic Cartography and Geo-Visualization* (3rd ed.). Prentice Hall.
- Steer, J. A. (1965). *An Introduction to the Study of Map Projection*. University of London.
- Talukder, S. (2008). *Introduction to Map Projections*. Eastern Book House, India.
- Tyner, J. A. (2010). *Principles of Map Design*. The Guilford Press.
- Unwin, D. (1981). *Introductory Spatial Analysis*. London: Methuen.

Paper Title: Computational tools for Geography Dissertation Writing

Paper code: GEOADL14034

Credit: 4

Marks: 100

Course Objectives:

- Equip students with fundamental computer skills, including file management, data protection, and hardware setup.
- Enable students to effectively use MS Office applications (Word, Excel, PowerPoint) for research, data analysis, and presentation.

Course Outcomes:

- Understand the basics of computer operations, including using the mouse and keyboard, managing files and folders, and installing printers.
- Gain proficiency in creating, formatting, and editing documents in MS Word, including the use of advanced features like text boxes and smart art.
- Develop skills in writing and formatting dissertations using MS Word's writer tools.
- Learn to clean and analyze geographic data using MS Excel, applying arithmetic, logical, and lookup functions.
- Create various types of graphs in MS Excel, such as line graphs, bar diagrams, histograms, pie charts, age-sex pyramids, and ergographs.
- Master the MS PowerPoint environment for creating and designing effective presentations with appropriate slide layouts, transitions, and animations.
- Acquire the ability to prepare and print PowerPoint presentations and handouts, ensuring professional presentation of research findings.

Unit I: Basics of Computer

Getting acquainted with: Mouse and Key board
Viewing of File, Folders and Directories, Searching for file, Sorting of files
Opening and closing of different Windows
Protection of files/ folders
Installation of printer and taking print outs

Unit II: Writing dissertation in MS Word

Familiarization of MS Word Environment
Writing /formatting of documents, tables, and references using MS word
Inserting, creating, and editing of text box, smart art
Writing dissertation in MS Word: Writers tool

Unit III: Analysis of Geographic data with MS Excel

Microsoft Excel: Data cleaning, Application of arithmetic functions
Application of if functions: Countif function, Sumif function
Application of Lookup function: Vlookup, Hlookup
Preparation of different forms of graph: Line graph, Bar Diagram, Histogram, Pie Chart, Age-Sex pyramid, Ergograph

Unit IV: Presentation of research findings with MS Powerpoint

Familiarization of MS Powerpoint Environment
Preparation of power point presentation, Identifying appropriate slide layout for presentation
Slide Show, Slide Transition and animation
Taking printouts of presentation / handouts.

Suggested Readings:

Behera, Soumya Ranjan (2019). Basic Computer Course. Vasan Publications.
Das, Kabir (2021). Microsoft Excel: Short Cut Keys and Formulas. Notion Press.
Kishor, SB (2023). Computer Application (Ms-Office). Das Ganu Prakashan.
Kumar, Bittu (2018). Mastering MS Office. V & S Publishers.
Maidasani, Dinesh (2016). Learning Computer fundamentals MS office and Internet & Web Technology. Laxmi Publications.
Mishra, Naveen (2019). Excel with Microsoft Excel: Comprehensive & Easy Guide to Learn Advanced MS Excel. Penman Books.
Pitch, Kevin (2022). Microsoft PowerPoint Guide for Success.

Paper Title: Research Methodology in Geography

Paper code: GEOADL14044

Credit: 4

Marks: 100

Course Objectives:

- Equip students with essential research methodology skills for geographical studies, including data collection, analysis, and research design.

- Enhance students' ability to write and present research proposals, papers, and dissertations with a strong emphasis on ethical research practices.

Course Outcomes:

- Comprehend the importance and types of research methodology in geography.
- Formulate research questions, hypotheses, and appropriate research designs.
- Utilize remote sensing, GIS, satellite imagery, and GPS for spatial data collection.
- Write comprehensive research proposals with literature reviews and conceptual frameworks.
- Present data using maps, charts, graphs, and GIS for effective visualization.
- Design and use questionnaires, interviews, and various sampling methods for data collection.
- Understand and apply ethical considerations and scientific conduct in research.

Unit I: Introduction to Research Methodology

Meaning and importance of research methodology, Types of research in Geography

Research process: planning, designing, and execution, Role of research questions and objectives

Research Design: Formulating research problems and hypotheses, Experimental, descriptive, and exploratory research designs, Variables and measurements in research

Spatial Data Collection Technique: Remote sensing and GIS in geographical research, Satellite imagery interpretation, GPS and geospatial data collection

Unit II: Writing Research Proposals

Components of a research proposal, Literature review and conceptual framework, Methodology: data collection and analysis plan, Ethical considerations in research

Data Presentation and Visualization: Data visualization techniques: maps, charts, graphs, Geographical Information System (GIS) for data presentation, Interpretation of research findings

Academic Writing and Referencing: Writing research papers and reports, Academic writing style and structure, Citation and referencing styles (e.g., APA, MLA)

Unit III: Research tool and technique

Data collection tools: Designing Questionnaire; Difference between Questionnaire and Interview

Schedule Data collection techniques: Face to face interview, Focus Group Discussion, Observation

Sampling: Simple Random Sampling, Areal Random Sampling, Systematic Sampling, Stratified Sampling, Cluster Sampling

Purposive Sampling: Quota Sampling, Accidental Sampling, Judgmental Sampling, Expert Sampling, Snowball Sampling

Scale of measurement in research

Unit IV: Research Ethics and Writing Dissertation

Research ethics: Informed Consent, Deception, Anonymity and Confidentiality, Involvement with Deviants, the Powerful, Special population and Coercion, and Publishing reports

Scientific Misconduct: Falsification, Fabrication, and Plagiarism

Dealing with Data: Coding, Entering, Cleaning, Analyzing, and Interpreting

Writing a Dissertation: Layout of dissertation, Steps in Writing Dissertation, Mechanics of writing a Dissertation

Suggested Readings

- Ackoff, R. L. (1961). *The Design of Social Research*. University of Chicago Press.
- Berry, R. (2004). *The Research Project: How to Write It* (5th ed.). Routledge.
- Goode, W. J., & Hatt, P. K. (1952). *Methods in Social Reserach*. McGraw Hill.
- Gomez, Basil & John Paul Jones III (2010). *Research Methods in Geography A Critical Introduction*.
- Harvey, D. (1969). *Explanation in Geography*. Edward Arnold.
- Hussain, M. (2007). *Models in Geography*. Rawat Publications. Wiley-Blackwell.
- Kothari, C. R. (1993). *Research Methodology: Methods and Techniques*. Wiley Eastern Ltd.
- Mishra, R. P. (2016). *Research Methodology: A Handbook*. Concept Publishing Company Pvt. Ltd.
- Misra, H. N., & Singh, V. P. (Eds.). (2017). *Research Methodology in Geography*. Rawat Publications.
- Montello, D. R., & Sutton, P. C. (2006). *An Introduction to Scientific Research Methods in Geography*. Sage Publications.
- Nalwa, V. (1992). *The ABC of Research for Behavioural and Social Sciences*. Wiley Eastern Ltd.
- Neuman, W. Lawrence (2014). *Social Research Methods: Qualitative and Quantitative Approaches*, Seventh Edition. Pearson Education Limited
- Prasad, H. (2008). *Research Methods and Techniques in Geography*. Shree Publishers & Distributors.
- Rogerson, Peter A (2001). *Statistical Methods for Geography*. Sage Publications.
- Stoddard, Robert (1982). *Field Techniques and Research Methods in Geography*. National Council for Geographic Education

Paper Title: Practical - I

Paper code: GEOADL14054

Credit: 4

Marks: 100

Course Objectives:

- Equip students with practical skills in climatic data analysis, quantitative techniques, and geographic research tools.
- Enable students to apply cartographic and surveying techniques through extensive fieldwork and data collection.

Course Outcomes:

- Identify sources and methods for collecting and analyzing weather and climate data.
- Measure and interpret atmospheric pressure, temperature, humidity, and precipitation data.
- Utilize graphical representation techniques for data analysis, including histograms, pie charts, and box plots.
- Apply statistical tests and measures, such as Chi-Square, t-tests, and correlation coefficients.
- Use online tools for geographic data collection and analysis, including Kobo Toolbox and Google Forms.
- Integrate technology in research, using tools like Grammarly, Mendeley, and AI for dissertation writing.
- Conduct prismatic, plane table, theodolite, dumpy level, and total station surveys, and report findings effectively.

Unit I: Analysis of Climatic Data

- Source of weather/climate data
- Measurement of atmospheric pressure using barometers, analysing pressure data and interpreting pressure map (pressure pattern and weather system)
- Using thermometers for temperature measurement, constructing temperature profile, analysing temperature data sets (diurnal variation, investigating urban heat island effect)
- Estimating evaporation rates using pan evaporation and other methods, dew point measurement and relative humidity, analysis of humidity data (hygrometers)
- Rain gauge calibration, measurement of rainfall, analysis of precipitation datasets (spatial and temporal patterns, installing raingauge and collecting precipitation data)
- Water balance graph
- Rose diagram for wind data
- Analysing historical climate data, identifying trends and anomalies and predicting future scenarios
- Preparation of weather reports of Indian subcontinent by analysing the weather satellite images of at least three consecutive days (e.g. INSAT 3D, NOAA satellite)
- Analysis and Interpretation of NASA's earth climate change map
https://earthobservatory.nasa.gov/global-maps/MOD_LSTD_M
- Analysis of climate change map of Google Earth Engine
<https://earthengine.google.com/timelapse/>

Unit II: Quantitative techniques

- Graphical Representation of data: Histogram, Stack Bar Diagram, Frequency Polygon, Frequency Curve, Cumulative Frequency Curve or Ogive, Pie Chart, Box plot
- Measures of central tendency
- Chi-Square Test
- t – test, F – test, Z – test
- Correlation: Pearson's product moment correlation coefficient and Spearman's rank correlation coefficient
- Linear Regression: Simple and Multiple Linear Regression
- Lorenz curve, Gini's Coefficient

Unit III: Tools and Techniques of Geographic Research

- Sample selection
- Online geographic data collection tool: Kobo Toolbox, Google form
- Smart use of Grammarly for dissertation writing
- Referencing tool: Mendeley
- Plagiarism check
- Converting dissertation to E-book with Navigation tools in Adobe Acrobat
- Use of AI in dissertation writing
- Analysis of Qualitative Data with Atlas-ti

Unit IV: Application of Cartography

The semester I students of the department will be required to select a suitable study area as per the convenience. The research area should be in and around Kokrajhar to make fieldwork more convenient. The students will then conduct an extensive fieldwork by applying the following methods on cartography and surveying techniques.

- i. Prismatic Survey
- ii. Plane Table Survey
- iii. Theodolite Survey
- iv. Dumpy Level
- v. Total Station

Details of the survey in the form of a report must be submitted to the Department within one week of the completion of the survey.

Suggested readings:

- Campbell, J. (1984). *Introductory Cartography*. Prentice Hall.
- Cuff, J. D. and M. M. T. (1982). *Thematic Maps: Their Design and Production*. Methuen Young Books.
- Dent, B. D., T. J. S. and H. T. W. (2008). *Cartography: Thematic Map Design* (6th ed.). McGraw Hill Higher Education.
- Gregory, S. (1978). *Statistical Methods and the Geographer*. London: Longman.
- Gregory, S. (1978). *Statistical Methods and the Geographer*. London: Longman.
- Johnston, R. J. (1973). *Multivariate Statistical Analysis in Geography*. London: Longman.
- Johnston, R. J. (1973). *Multivariate Statistical Analysis in Geography*. London: Longman.
- King, L. J. (1969). *Statistical Methods in Geographical Studies*. London.
- King, L. J. (1969). *Statistical Methods in Geographical Studies*. London.
- Kraak, M. J. and O. F. (2003). *Cartography: Visualization of Geo-Spatial Data*. Prentice Hall.
- Lawrence, G. R. P. (1964). *Cartographic Methods*. Oxford University Press.
- Mahmood, A. (1977). *Statistical Methods in Geographical Studies*. Delhi: Concept Publications.
- Mahmood, A. (1977). *Statistical Methods in Geographical Studies*. Delhi: Concept Publications.
- McCullagh, H. R. and P. S. (1974). *Quantitative Techniques in Geography: An Introduction*. Oxford: Clarendon Press.
- McCullagh, H. R. and P. S. (1974). *Quantitative Techniques in Geography: An Introduction*. Oxford: Clarendon Press.
- Mishra, R. P. and R. A. (1989). *Fundamentals of Cartography*. Concept.
- Monkhouse, F. J. and W. H. R. (1989). *Maps and Diagrams*. B.I. Publication Pvt. Ltd.
- Paul, S. K. (1998). *Statistics for Geoscientists*. New Delhi: Tata McGraw Hill.
- Paul, S. K. (1998). *Statistics for Geoscientists*. New Delhi: Tata McGraw Hill.
- Robinson, A. H. et. al. (1995). *Elements of Cartography* (6th ed.). John Wiley & Sons.
- Robinson, G. M. (1998). *Methods and Techniques in Human Geography*. Chichester: John Wiley & Sons.
- Robinson, G. M. (1998). *Methods and Techniques in Human Geography*. Chichester: John Wiley & Sons.
- Slocum, T. A., M. R. B. and K. F. C. (2008). *Thematic Cartography and Geo-Visualization* (3rd ed.). Prentice Hall.
- Tyner, J. A. (2010). *Principles of Map Design*. The Guilford Press.
- Yeats, M. (1974). *An Introduction to Quantitative Analysis in Human Geography*. New York: McGraw, Hill.
- Yeats, M. (1974). *An Introduction to Quantitative Analysis in Human Geography*. New York: McGraw, Hill.

Semester: II

Geomorphology Specialization (A)

Paper Title: Geography of North-East India

Paper code: GEOADL14064

Credit: 4

Marks: 100

Course Objectives:

- Provide an in-depth understanding of the physical, demographic, and socio-economic characteristics of North-East India and Assam.
- Analyze the geographical and socio-economic dynamics of the Bodoland Territorial Region (BTR).

Course Outcomes:

- Understand the locational significance, physiographic divisions, and climate of North-East India.
- Analyze the drainage systems, vegetation, and soil types in North-East India.
- Study population growth, density, and composition in North-East India, including religious and ethnic aspects.
- Examine agricultural practices, industrial development, and transport in North-East India.
- Identify socio-economic disparities and biodiversity resources in North-East India.
- Comprehend the geographical features, climate, and significance of the Brahmaputra in Assam.
- Analyze the demographic and socio-economic dynamics of the Bodoland Territorial Region (BTR).

Unit I: North-East India

Locational significance of North East India

Physiographic divisions and climate of North East India

Drainage system, Vegetation and Soil types of North East India

Population growth, density, age-sex composition,

Composition: religious composition, ethnic composition

Unit II: Socio-economic traits of North-East India

Agricultural practices: Types of farming, major crops and distribution

Industrial development: Types of Industries, problems and prospects

Transport and communication,

Disparity in socio-economic development and problems

Resources and biodiversity

Unit III: Geography of Assam

Locational significance of Assam

Physiographic divisions and climate of Assam

Significance of Brahmaputra

Soil of Assam

Population growth and spatial distribution

Unit IV: Dynamics of BTR

Location and formation of BTR

Population growth, density, age-sex composition, caste composition, and religious composition

Literacy rate, Educational attainment level

Dependency ratio, work participation

Forest cover, National Park, Biodiversity

Suggested Readings:

Barad, Gomit K (2018). Geography of North East India. Pacific Books International.

Bhagabati, AK, Bora, AK & Kar, BK (2018). Geography of Assam. Rajesh Publications: New Delhi.

Bhakta, GP (1992). Geography of North-East India. Akashi Book Depot: Shillong.

Bhattacharyya, NN (2018). North East India, A Systematic Geography. Rajesh Publications: New Delhi.

Choudhury, RKD (2021). Demographic Scenario of the North East India. Concept Publishing Company Pvt. Ltd.

Devee, Geeta & Das, Puspanjalee (2018). North-East India: A Comprehensive Geography. EBH Publishers (India).

Saikia, [Sailajananda](#); [Nimasow, Gibji & Sora](#), Tage Rupa (2023). Unveiling the Mystique: Diversity in Geography of NE India. Notion Press.

Paper Title: Advanced Remote Sensing and Geographic Information System

Course Code: GEOSPL15074

Credit: 4

Marks: 100

Course Objectives:

- Provide comprehensive knowledge of hyper-spectral and microwave remote sensing techniques, including their applications and limitations.
- Equip students with skills in digital image processing and the use of programming languages and AI in remote sensing and GIS.

Course Outcomes:

- Understand the principles of hyper-spectral remote sensing and thermal imaging.
- Learn about various hyper-spectral imaging sensors and their applications.
- Comprehend the basics of microwave remote sensing, including radar imaging and its properties.
- Differentiate between passive and active microwave remote sensing systems.
- Gain proficiency in digital image processing techniques, including pre-processing and image enhancement.
- Understand the role of programming languages and AI in remote sensing and GIS.
- Explore the use of cloud computing and automation in various applications of remote sensing, such as agriculture and hydrology.

Unit I: Introduction to Hyper-spectral Imaging

What is Hyper-spectral Remote Sensing, Airborne Visible Infrared Imaging Spectrometer, Compact Airborne Spectrographic Imager-2, Compact High resolution Imaging Spectrographic Imager-2

Thermal Remote sensing; Radiant versus Kinetic Temperature, Black body radiation, Thermal Imaging, properties and mapping, Thermal remote sensing sensors

Advantages and limitations of Hyper-spectral Remote Sensing remote sensing

Unit II: Introduction to Microwave Remote Sensing

Passive and Active Microwave Remote Sensing

Radar Imaging; Frequency/Wavelength, Polarization, Viewing Geometry, Spatial resolution of Radar system, Speckle, Surface geometry and roughness, Dielectric properties.

Airborne versus space-borne Radars, Radar Systems

Advantages and disadvantage of Radar Remote sensing

Unit III: Digital Image processing

Categorization of Image Processing

Image Processing System

Digital Image and its formats

Header Information and display of digital Image

Pre-Processing: Radiometric, Geometric and other

Image enhancement, Transformation, and transformation

Unit IV: Programming language and AI in Remote Sensing and GIS

Introduction to Programming languages and computer system

Introduction to Artificial Intelligence and Machine Learning in RS and GIS

Google Earth engine, and Cloud computing

Automation in image processing: Earth science, Agriculture, Forestry, Hydrology and flood

Suggested Books:

Bhatta B., 2018: Remote Sensing and GIS, Oxford

Burrough, P.A. and McDonnell, R.A., 1998: *Principles of Geographical Information Systems*, Oxford University Press.

Campbell J. B., 2007: *Introduction to Remote Sensing*, Guildford Press.

Chauniyal, D.D. (2010): *Sudur Samvedanevam Bhogolik Suchana Pranali*, ShardaPustakBhawan, Allahabad.

Jensen J. R., 2004: *Introductory Digital Image Processing: A Remote Sensing Perspective*, Prentice Hall.

Joseph, G. 2005: *Fundamentals of Remote Sensing*, United Press India.

Lillesand T. M., Kiefer R. W. and Chipman J. W., 2004: *Remote Sensing and Image Interpretation*, Wiley. (Wiley Student Edition).

Nag P. and Kudra, M., 1998: *Digital Remote Sensing*, Concept, New Delhi.

Rees W. G., 2001: *Physical Principles of Remote Sensing*, Cambridge University Press.

Sarkar, A. (2015): *Practical Geography: A Systematic Approach*. Orient Black Swan PrivateLtd., New Delhi.

Singh R. B. and Murai S., 1998: *Space-informatics for Sustainable Development*, Oxford and IBH Pub.

Wolf P. R. and Dewitt B. A., 2000: *Elements of Photogrammetry: With Applications in GIS*, McGraw-Hill.

Paper Title: Advanced Geomorphology

Paper code: GEOSPL15084

Credit: 4

Marks: 100

Course Objectives:

- Provide a comprehensive understanding of advanced concepts, methodologies, and theories in geomorphology.
- Enable students to analyze and interpret regional geomorphological features and landscape evolution.

Course Outcomes:

- Understand the development and fundamental concepts of advanced geomorphology.
- Analyze landform structures using morphology-based approaches.
- Assess the impact of climatic factors on landforms through climate-based methodologies.
- Comprehend key geomorphological theories and their historical context.
- Examine hillslope processes and their role in slope evolution and stability.
- Differentiate and classify various types of slopes and their development.
- Analyze the geomorphological features of specific regions, such as the Deccan Plateau and North East India.

Unit I: Advanced Concepts in Geomorphology

Fundamental Concepts and Development of Advanced Geomorphology

Overview of geomorphological evolution in the late 20th century.

Key contributions and theoretical advancements.

Major Contemporary Methodologies

Morphology-based approaches: Analysis of landform structures.

Climate-based approaches: Impact of climatic factors on landforms.

Process-based approaches: Understanding geomorphological processes.

Geotechnical science-based approaches: Integrating geotechnical data in geomorphological studies.

Time and Space in Geomorphology

Nature of time: Geological time scales, episodic and continuous processes.

Sampling of time: Techniques for temporal data collection and interpretation.

Nature of space: Spatial distribution of geomorphological features.

Unit II: Landscape Evolution Theories

Development of Geomorphological Theories

Historical context and evolution of key theories.

Significance and need for theoretical frameworks in geomorphology.

Major Geomorphological Theories

Uniformitarianism (James Hutton) & Catastrophism (Georges Cuvier)

Daviesian Cycle of Erosion (W.M. Davis)

Dynamic Equilibrium (John T. Hack)
Steady State Landscape Theory (William Morris Davis)
Theories by W. Penck
Threshold Theory (Luna B. Leopold)
Dynamic equilibrium and related investigations (G.K. Gilbert)
Cyclic models (L.C. King)
Tectono-geomorphic models (M. Morisawa)

Unit III: Hill Slope Evolution & Development

Hillslope Processes

Soil creep and solifluction: Mechanisms and impacts.
Mass wasting: Types (landslides, rockfalls, debris flows) and their mechanisms.
Weathering-limited and transport-limited slopes: Characteristics and differentiation.

Hillslope Forms and Evolution

Slope development: Importance and methodologies.
Classification of slopes: Convex, concave, planar.
Soil properties affecting slope stability: Cohesion, internal friction, soil shear strength.
Failure criteria: Analyzing slope stability and potential failure.

Unit IV: Regional Geomorphology

Definition and scope of regional geomorphology; Importance of regional studies in geomorphology; Overview of major geomorphological regions of the world
Geomorphology of Specific Regions: Deccan Plateau: Geological structure and landform characteristics
North East India: Geomorphological features and regional significance.

Suggested Readings:

- Ahmad, E. (1985). *Geomorphology*. Kalyani Publishers.
- Bloom, A. L. (1978). *Geomorphology- A Systematic Analysis of Late Cenozoic Landforms*. Prentice Hall.
- Chorley, R. (1972). *Spatial Analysis in Geomorphology*. Harper & Row.
- Dayal, P. (1996). *A Textbook of Geomorphology* (2nd ed.). Shukla Book Depot.
- Derbishire, E. (ed). (1976). *Geomorphology and Climate*. John Wiley and Sons Ltd.
- Dixit, K. R. (ed). (1983). *Contribution to Indian Geomorphology*. Heritage.
- Embelton, C. and T. J. (1982). *Processes in Geomorphology* (First Indian Edition). Arnold Heinemann.
- Embelton, C. B. D. and J. D. K. C. (ed). (1978). *Geomorphology: Present Problems and Future Prospects*. Oxford University Press.
- Engeln, O. D. Von. (1942). *Geomorphology*. McMillan.
- Fairbridge, R. W. (ed). (1968). *Encyclopaedia of Geomorphology*. Reinhold.
- Goudie, A. et. al (ed). (1981). *Geomorphological Techniques*. George Allen and Unwin.
- Gregory, K. J. (1985). *The Nature of Physical Geography*. Edward Arnold.
- Hart, M. G. (1986). *Geomorphology: Pure and Applied*. Allen & Unwin.
- Holmes, A. (1968). *Principles of Physical Geology*. Nelson.
- Jensen, J. R. (2011). *Remote Sensing of the Environment - An Earth Resource Perspective* (3rd ed.). Pearson.

Penck, W. (1924). *Morphological Analysis of Landforms*. McMillan.
Sharma, V. K. (1986). *Geomorphology: Earth Surface Processes and Forms*. Tata McGraw Hill.
Steer, J. A. (1958). *The Unstable Earth*. Methuen.
Strahler, A. N. (1969). *Physical Geography* (3rd ed.). Wiley.
Thornbury, W. D. (1969). *Principles of Geomorphology* (2nd ed.). Oliver and Boyd.
Wooldridge, S. W. & M. R. S. (1948). *The Physical Basis of Geography*. Longman.

Paper Title: Environmental Geomorphology

Paper code: GEOSPL15094

Credit: 4

Marks: 100

Course Objectives:

- Explore the components and scope of environmental geomorphology, focusing on resources and hazards.
- Analyze the impact of natural and anthropogenic activities on geomorphological processes and hazards.

Course Outcomes:

- Understand the role of geomorphology in assessing and managing natural resources such as soil and raw materials.
- Evaluate how geomorphology contributes to the exploration and utilization of other natural resources.
- Examine the consequences of human activities on geomorphological processes and landscapes.
- Classify and analyze environmental hazards, including geological, geomorphological, climatic, and oceanic hazards.
- Explore the causes, distribution, and impacts of geological and geomorphological hazards like earthquakes, landslides, and marine hazards.
- Investigate climate variability mechanisms and hazards such as storms, droughts, and floods.
- Assess risk and vulnerability related to environmental hazards, including responses, preparedness, and environmental impact assessments.

Unit I: Fundamentals

Environmental Geomorphology: components and scope

Aspects of geomorphological resources: soil, raw materials, resources and reserves

Contribution of geomorphology in search of other natural resources

Man's activities and their geomorphological consequences

Unit II: Geohazards

Classification of Environmental Hazards

Causes and Distribution of Geological Hazards: Earthquakes, Volcanoes and Tsunamis

Geomorphological Hazards: Soil Erosion, Land Instability, Marine hazard, glacial and periglacial hazard

Unit III: Climatic Hazard

Mechanism of Climate Variability: models of atmospheric circulation and change
Change in jet stream paths, The southern Oscillation, Astronomical Cycles
Large-scale storm as hazard, Localised storms
Drought and Flooding as a hazard
Fire and Oceanic Hazard

Unit IV: Risk and Vulnerability

Personal and Group responses to hazard: warning and evacuation, Preparedness, response during event, and additional impacts
Vulnerability and Geomorphological Risk
Geomorphology and Environmental Impact Assessment
Prediction and forecast

Suggested Reading:

- Bull, W. B. (2009). Tectonically Active Landscapes. Wiley-Blackwell.
- Burbank, D. W., & Anderson, R. S. (2011). Tectonic Geomorphology (2nd ed.). Wiley-Blackwell.
- Chorley, R. J., Schumm, S. A., & Sugden, D. E. (1984). Geomorphology. Methuen.
- Cooke, R. U., & Doornkamp, J. C. (1990). Geomorphology in Environmental Management: A New Introduction (2nd ed.). Oxford University Press.
- Goudie, A. S. (2013). The Human Impact on the Natural Environment: Past, Present, and Future (7th ed.). Wiley-Blackwell.
- Huggett, R. J. (2011). Fundamentals of Geomorphology (3rd ed.). Routledge.
- McFadden, L. D., Knuepfer, P. L. K., & Harden, J. W. (Eds.). (2008). Quantitative Geomorphology of Landscapes: Studies in Honor of Robert P. Sharp. Allen & Unwin.
- Panizza, M. (1996). Environmental Geomorphology. Elsevier
- Ritter, D. F., Kochel, R. C., & Miller, J. R. (2011). Process Geomorphology (5th ed.). Waveland Press.
- Summerfield, M. A. (1991). Global Geomorphology: An Introduction to the Study of Landforms. Pearson Education.
- Trenhaile, A. S. (2010). Geomorphology: A Canadian Perspective (4th ed.). Oxford University Press.

Paper Title: Practical-II

Paper Code: GEOSPL15104

Credit: 4

Marks: 100

Course Objectives:

- Equip students with practical skills in radar remote sensing, multispectral image analysis, advanced geomorphology, and environmental geomorphology using various tools and techniques.
- Enable students to apply remote sensing and geomorphological methods to analyze and assess environmental features and hazards.

Course Outcomes:

- Familiarize with SNEP tool and radar image preprocessing techniques.
- Map water bodies, soils, and vegetation using radar remote sensing.
- Gain proficiency in using Google Earth Engine/QGIS for multispectral image analysis.
- Classify land cover and map urban sprawl, heat distribution, and thermal patterns.
- Calculate NDVI (Normalized Difference Vegetation Index) and NDWI (Normalized Difference Water Index) for vegetation and water mapping.
- Utilize digital elevation models (DEMs) for terrain analysis and measurement of geomorphic parameters.
- Conduct flood frequency analysis, estimate flood hazards and inundation areas, and assess flood risks using environmental geomorphological techniques.

Unit I: Application of Radar Remote Sensing

- Familiarizing SNEP tool
- RADAR image preprocessing
- Water body mapping
- Soil mapping
- Vegetation mapping

Unit II: Application of Multispectral image

- Familiarizing Google Earth Engine/QGIS
- Land Cover classification
- Urban sprawl mapping
- Heat and thermal mapping
- NDVI and NDWI

Unit III: Advance Geomorphology

- Digital elevation models (DEMs) and terrain analysis, Measurement of slopes, stream gradients, and other geomorphic parameters **Generate Slope and Aspect Maps;**
- Delineate watersheds and extract the drainage network; compute relief, curvature, and hypsometric curves
- Grain size analysis of sediments
- Interpretation of landforms and processes: Determine the dominant fluvial processes (erosion, transport, deposition) shaping the valley

Unit IV: Environmental Geomorphology

- Mapping and assessing landforms as geomorphological assets using satellite imagery; Compare historical maps, Conduct a detailed field survey (river valley, terraces, meanders, and floodplains etc.)
- Flood frequency analysis
- Flood hazard estimation/inundation area
- Flood risk assessment

Semester III

Geomorphology Specialization (A)

Paper Title: Settlement Geography

Paper code: GEOSPL25014

Credit: 4

Marks: 100

Course Objectives:

- Provide a comprehensive understanding of settlement geography, focusing on the types, patterns, and theories related to human settlements.
- Analyze the processes, classifications, and challenges of urbanization and urban development in both Indian and global contexts.

Course Outcomes:

- Define and explain the scope of settlement geography, including the origin, growth, types, patterns, and house types of settlements.
- Examine rural-urban relationships, understanding the dichotomy and continuum between rural and urban areas.
- Classify settlements based on functional characteristics, cultural aspects, stages of growth and decay, and according to Indian census classifications.
- Understand prominent theories and models in settlement geography, such as the Rank Size Rule, Primate City Model, and Central Place Theory.
- Analyze urbanization processes, urbanism, and the factors contributing to urban sprawl and urban agglomeration.
- Evaluate issues related to slums and squatter settlements, including their causes, development factors, and associated socio-economic problems.
- Assess urbanization trends and challenges in India and globally, including the impact on physical and social environments and the role of urban planning in sustainable development.

Unit I: Fundamentals of Settlement Geography

Definition and scope of settlement geography

Origin and growth of settlements

Settlement types, Pattern and house types

Concept of site and situation in settlement geography

Tribal settlements of Western, Central and North East India

Unit II: Classification of settlements

Rural- urban relationship: dichotomy and continuum

Classification of settlement based on Rural(functional), Urban (Culture, stages of growth and Decay, functional classification of urban centers and Indian Cities-Ashok Mitra, Mukherjee and others, Census 1991).

Unit III: Theory and models in Settlement Geography

Rank Size Rule, Primate City Model, Central Place Theory

Concentric zone model, Sectorial Model, Multiple Nuclei Model

Unit IV: Urbanization, Urbanism and the City

Process of Urbanization and Urbanism

Urban sprawl, Urban fringe, and Urban Agglomeration

Slums and squatter: Cause and factors of its development and associated problems

Urbanization, Urbanism, Urban planning and its challenges; Physical and social Environment

Urbanization in India/World

Suggested Readings:

Bhende, A. A., & Kanitkar, T. (2019). *Principles of Population Studies*. Himalaya Publishing House.

Chandna, R. C. (2015). *Geography of Population*. Kalyani Publishers.

Hassan, M.I. (2007). *Population Geography*. Rawat Publications.

Hussain, J. (2021). *Settlement Geography*. Notion Press.

Husain, M. (2016). *Moddels in Geography*. Rawat Publications.

Husain, M. (2021). *Human Geography*. Sixth Edition. Rawat Publications.

Ghosh, S. (2015). *Introduction to Settlement Geography*. Orient Blackswan

Khullar, D.R. (2018). *India, A comprehensive Geography*. Kalyani Publishers.

Lundquist, J.H., Anderton, D.L., & Yaukey, D. (2015). *Demography, The Study of Human Population*. Fourth Edition. Waveland Press, Inc.

Newbold, K.B. (2017). *Population Geography: Tools & Issues*. Rawat Publications.

Ram, F. & Pathak, K. B. (1998). *Techniques of Demographic Analysis*. Himalaya Publishing House.

Singh, R.Y. (2002). *Geography of Settlements*. Rawat Publications.

Tiwari, R.C. (2020). *Settlement Geography, Rural and Urban Settlements*. Pravalika publication.

Paper Title: Tectonic Geomorphology

Paper code: GEOSPL25024

Credit: 4

Marks: 100

Course Objectives:

- Introduce students to the concepts, scope, and methods of tectonic geomorphology, focusing on the interaction between tectonic forces and landscape development.
- Familiarize students with the study of tectonic landforms, deformation processes, dating methods, and modeling techniques in geomorphology.

Course Outcomes:

- Understand the fundamentals and scope of tectonic geomorphology, including the relationship between active tectonics and landscape evolution.
- Analyze geomorphic markers and their limitations in interpreting tectonic processes and landscape development.
- Evaluate various dating methods used in establishing the timing of landscape evolution in tectonic settings.
- Describe endogenetic forces such as stress, faulting, and folding, and their impact on landform development.
- Examine short-term deformation processes through geodesy and paleoseismology, including seismic moment and fault displacement.

- Discuss erosion, uplift rates, and their role in shaping tectonic landforms over geological timescales.
- Explore the effects of Holocene deformation and landscape responses, and analyze tectonic geomorphology at different geological time scales using modeling approaches.

Unit I: Introduction to Tectonic Geomorphology

Concepts and scope of tectonic geomorphology

Tectonic Geomorphology, Active Tectonics and Models of Landscape development.

Geomorphic markers and its limitation

Establishing Timing in the Landscape: Dating Methods

Unit II: Endogenetic force and Tectonic Landforms

Stress, Fault, and Folds

Short-Term Deformation: Geodesy

Paleoseismology: Seismic moment and moment magnitudes, Direct observation of Paleoseismic displacement, Displaced geomorphic features, Indirect observation of faulting

Erosion and Uplift: Erosion and denudation, Rates of uplift

Unit III: Tectonic landform in recent period

Holocene Deformation and Landscape responses

Deformation and geomorphology at intermediate time scale

Tectonic Geomorphology at Lateral Cenozoic Time Scales

Unit IV: Modeling in Tectonic Geomorphology

Introduction to Modeling in Tectonic Geomorphology

Approaches in modeling

Types of model

Important variables in modeling

Advantages and Disadvantages of modeling

Suggested Reading:

Anderson, R. S., & Anderson, S. P. (2010). *Geomorphology: The mechanics and chemistry of landscapes*. Cambridge University Press

Bull, W. B. (1991). Geomorphic response to tectonics: The importance of knowing the process. In *International Geomorphology 1986* (pp. 25-39). Springer, Dordrecht

Bull, W. B. (2007). *Tectonic geomorphology of mountain ranges*. Oxford University Press.

Burbank, D. W., & Anderson, R. S. (2016). *Tectonic geomorphology*. John Wiley & Sons.

Davis, W. M. (1899). The geographical cycle. *Geographical Journal*, 14(5), 481-504.

Hancock, P. L., & Skinner, B. J. (2000). *The Oxford companion to the earth*. Oxford University Press.

Hanks, T. C., & Kanamori, H. (1979). A moment magnitude scale. *Journal of Geophysical Research: Solid Earth*, 84(B5), 2348-2350.

Schumm, S. A., & Lichty, R. W. (1965). Time, space, and causality in geomorphology. *American Journal of Science*, 263(2), 110-119.

Waltham, T. (2009). *Tectonic geomorphology of mountains: A new approach to paleoseismology*. John Wiley & Sons.

Willett, S. D. (2014). Tectonics, climate, and landscape evolution. Cambridge University Press.

Paper Title: Climatic Geomorphology

Paper code: GEOSPL25034

Credit: 4

Marks: 100

Course Objectives:

- Introduce the fundamentals of climatic geomorphology, encompassing its definition, scope, and the interaction between climate and landforms.
- Explore specific climatic zones—humid tropics, arid zones, and glacial/periglacial environments—and their distinct geomorphological processes and landforms.

Course Outcomes:

- Define climatic geomorphology and its role in shaping landscapes through climate-driven processes.
- Analyze morpho-climatic zonation and the characteristics of different climatic zones.
- Understand the concept of the geographical cycle and its stages, emphasizing the influence of climate on landscape evolution.
- Describe the climatic characteristics of humid tropics, including climate, vegetation, and associated landforms like fluvial erosive and sedimentary landforms.
- Explain weathering processes in humid tropics—physical, biological, and chemical—and their impact on landscape development.
- Identify causes of aridity and features of desert climates, and differentiate geomorphological characteristics of desert areas.
- Explore glacial processes such as erosion, transport, and sedimentation, and periglacial processes like frost action and nival processes, focusing on their resulting landforms.

Unit I: Introduction to Climatic Geomorphology

Structure of Climatic Geomorphology: Definition and scope

Processes and Morpho-climatic Zonation: Zonal concept, Morpho-climatic zones and their characteristics

The Geographical Cycle: Concept and stages, Impact of climate on the geographical cycle

Unit II: Humid Tropics

Climatic Characteristics: - Climate, vegetation, and morphoclimatic domains

Weathering in the Humid Tropics: - Physical, biological, and chemical weathering, Weathering degrees and products, Weathering profile, depth, and zone

Tropical Landforms: Erosion and sedimentation in fluvial systems, - Fluvial erosive and sedimentary landform, Landforms developed on laterites, etched plains, inselbergs, tropical karst

Unit III: Arid Zones

Causes and Features of Aridity: Causes of aridity and desert climatic features, Geomorphological differentiation of desert areas

Weathering in Deserts: Insolation weathering, wetting and drying, salt weathering, dissolution, biological activity, Resultant weathering forms

Aeolian Processes and Landforms

Action of water in arid regions, fluvial forms and processes

Morphology and development of pediments and alluvial fans

Unit IV: Glacial and Periglacial Environments

Glacial Processes: - Past and present extension of glaciers, - Mass balances of glaciers, snow-ice transformation, classification, and movement of glaciers

Glacial erosion, Glacial transport and sedimentation, glacial landforms

Permafrost and periglacial processes: frost action, chemical weathering, mass movements, nival processes, fluvial activities

Perglacial landforms: patterned ground, ice-cored mounds, slope morphology and evolution, fluvial landforms, thermo karst

Suggested Reading:

Bush, Mark B. and Flenley, John R. (2007). Tropical Rainforest Responses to Climatic Change. Springer.

Gutiérrez, M. (Ed.).(2013). Climatic geomorphology. Elsevier

Derbyshire, E. (Ed.). (1973). Climatic geomorphology. The Macmillan Press Ltd

Gupta, A. (2011). Tropical geomorphology. Cambridge University Press.

Livingstone, Ian and Warren, Andrew (2019). Aeolian Geomorphology: A New Introduction. Wiley Blackwell.

Owens, Philip N and Slaymaker, Olav (2004). Mountain Geomorphology. Routledge.

Summerfield, M. A. (1991). Global geomorphology: An introduction to the study of landforms. Longman Scientific & Technical

Thomas, D. S. G. (Ed.). (2011). Arid zone geomorphology: Process, form and change in drylands (3rd ed.). Wiley-Blackwell.

Whiteman, C. A. (2012). Cold region hazards and risks. Wiley-Blackwell.

Paper Title: Fluvial Geomorphology

Paper code: GEOSPL25044

Credit: 4

Marks: 100

Course Objectives:

- Provide an overview of fluvial geomorphology, including its definition, scope, and significance in understanding river systems.
- Explore fundamental fluvial processes such as erosion, transportation, and deposition, and their role in shaping landscapes.
- Examine the morphology of river basins, catchment areas, and drainage patterns, along with the historical development of fluvial geomorphology theories.

Course Outcomes:

- Define fluvial geomorphology and its relevance in studying the dynamics of river systems.
- Describe the basic processes of fluvial erosion, transportation (bedload, suspended load, and dissolved load), and deposition.

- Analyze the longitudinal and cross-sectional profiles of river systems and understand their morphological evolution.
- Identify different channel patterns (straight, meandering, braided, anastomosing) and their formation processes.
- Evaluate the stability of river channels and factors influencing bank erosion.
- Discuss human impacts on channel forms, including the effects of dams, channelization, and changes in land use.
- Examine sediment types, transport mechanisms, sediment yield factors, and deposition processes in fluvial environments.

Unit I: Fundamentals of Fluvial Geomorphology

Introduction to Fluvial Geomorphology: Definition, scope, and significance.

Basic Fluvial Processes: Erosion, transportation, and deposition.

River Systems: Catchment areas, watersheds, and drainage patterns.

River Basin Morphology: Longitudinal and cross-sectional profiles of rivers.

Historical Development: Evolution of fluvial geomorphology theories and models.

Unit II: Channel Forms and Processes

Channel Patterns and Forms: Types of channels (straight, meandering, braided, and anastomosing).

Channel Initiation and Development: Processes involved in channel formation.

Channel Morphodynamics: Evolution and stability of channel forms.

Bank Erosion and Stability: Mechanisms and influencing factors.

Human Impacts on Channel Forms: Effects of dams, channelization, and land use changes.

Unit III: Fluvial Sediment Transport and Deposition

Sediment Types and Properties: Classification and characteristics.

Sediment Transport Mechanisms: Bedload, suspended load, and dissolved load.

Sediment Yield and Budget: Factors affecting sediment yield, sediment rating curves.

Deposition Processes: Sorting, stratification, and formation of sedimentary structures.

Channel Deposits: Point bars, channel bars, and riffles.

Unit IV: Management & Restoration

Floodplain Dynamics: Hydrology, sedimentation, and nutrient cycling.

Flood Risk Management: Assessment, mitigation strategies, and policy frameworks.

Restoration Techniques: Re-naturalization, re-vegetation, and habitat enhancement.

Suggested Reading:

Babar, M. (2005). *Hydrogeomorphology: Fundamentals, Applications and Techniques*. New India Publishing Agency.

Charlton, C. (2008). *Fundamentals of Fluvial Geomorphology*. Routledge Taylor & Francis Group.

Chorley, R. J. S. S. A. and S. D. E. (1985). *Geomorphology*. Methuen.

Leopold, L. B. , W. M. G. and M. J. P. (1995). *Fluvial Processes in Geomorphology*. Dover Publication. INC.

Maiti, R. (2016). *Modern Approaches to Fluvial Geomorphology*. Primum Books.
Morisawa, M. (1985). *Rivers, Landforms and Processes*. Longman.
Ritter, D. F. (1989). *Process Geomorphology*. Wm. C Publisher.

Paper Title: Practical – III

Paper code: GEOSPL25054

Credit: 4

Marks: 100

Course Objectives:

- Equip students with foundational knowledge and analytical skills in settlement geography, tectonic geomorphology, climatic geomorphology, and fluvial geomorphology.
- Develop practical competencies in applying various methods and techniques to analyze settlement patterns, geological influences, climatic impacts, and fluvial processes.

Course Outcomes:

- Analyze and interpret settlement patterns using hierarchical and network analysis methods.
- Apply geological mapping techniques to identify tectonic influences on landscape morphology.
- Characterize climatic zones and their impact on landforms through morphoclimatic classification and Peltier diagrams.
- Evaluate the dynamics of river systems, including pattern mapping, sinuosity analysis, and braiding assessments.
- Utilize Ross diagrams and Bull's method to quantify valley floor characteristics influenced by tectonic forces.
- Assess the mass balance of glaciers and interpret results using ternary diagrams for duricrust identification.
- Demonstrate proficiency in mapping fluvial sub-environments and understanding their evolution under tropical climate conditions.

Unit I: Settlement Geography

- Hierarchy
- Organization and pattern
- Nearest Neighbor Analysis
- Network analysis
- Distance Decay

Unit II: Tectonic Geomorphology

- Lineament mapping
- Ross diagram
- Valley floor width and valley height ratio by Bull's method
- River basin morphometry and tectonic impact study
- Geological Study: Identify rock types and structural features influencing the valley

Unit III: Climatic Geomorphology

- Peltier diagrams
- Morphoclimatic classification according to Chorley et al (1984)
- Mapping Morphoclimatic Zones of the Earth
- Mass balance of glacier
- Ternary Diagram to identify types of duricrust

Unit IV: Fluvial Geomorphology

- River Pattern mapping and analysis
- River Braiding analysis
- River Sinuosity analysis
- Slope profile
- Mapping of fluvial sub-environment
- Examine influence of tropical climates on fluvial processes and landforms

Semester IV

Geomorphology Specialization

Paper Title: Environment and Sustainable Development

Paper code: GEOSPL25064

Credit: 4

Marks: 100

Course Objectives:

- Provide a comprehensive understanding of environmental concepts and sustainable development principles, emphasizing their interrelationships.
- Explore global environmental issues and sustainable development goals (SDGs), focusing on their significance, challenges, and implementation strategies.

Course Outcomes:

- Explain the components and types of environment, and analyze human-environment interactions.
- Describe the principles and pillars of sustainable development and discuss their application in economic, social, and environmental contexts.
- Evaluate causes, impacts, and mitigation strategies related to climate change.
- Assess biodiversity loss, its consequences, and conservation measures.
- Identify types, sources, impacts, and control measures of pollution.
- Analyze resource depletion, types of natural resources, and strategies for sustainable management.
- Discuss selected SDGs relevant to geography, including their objectives, challenges in implementation, and roles of stakeholders like governments, NGOs, and international organizations.

Unit I: Introduction to Environment and Sustainable Development

Concept of Environment: Definition, components, and types of environment, Human-environment interactions

Concept of Sustainable Development: Definition and history - Principles and pillars of sustainable development (economic, social, and environmental)

Unit II: Global Environmental Issues

Climate Change: - Causes, impacts, and mitigation strategies

Biodiversity Loss: - Causes, impacts, and conservation strategies

Pollution: - Types, sources, impacts, and control measures

Resource Depletion: - Types of natural resources, overexploitation, and sustainable management

Unit III: Sustainable Development Goals (SDGs)

Overview of SDGs: - History and significance of the SDGs - Detailed study of selected SDGs relevant to geography

Implementation and Monitoring: - Strategies for achieving SDGs - Role of governments, NGOs, and international organizations

Unit IV: Human-Environment Interactions

Land Use and Land Cover Change: - Causes, impacts, and sustainable management

Urbanization and Environment: - Impacts of urbanization on the environment and sustainable urban planning

Agriculture and Environment: - Sustainable agricultural practices and their environmental impacts

Energy and Environment: - Renewable and non-renewable energy sources, and sustainable energy strategies

Suggested Reading:

Cunningham, William and Cunningham, Mary (214). Environmental Science: A Global Concern. McGraw Hill-Education.

Brundtland, G.H. (1987). Our Common Future: Report of the World Commission on Environment and Development. Geneva, UN-Dokument A/42/427

Devaki, N (2019). Education for Sustainable Development. Shanlax Publications.

Fulekar, MH & Dubey, Shanker (2023). Climate Change and Sustainable Development. CRC Press.

Gope, Arjun; Sarkar, Abhijit; Sarkar, Prasamita; Majumder, Santanu & Gosai, Kuldip (2019). Environmental Issues & Sustainable Development. Notion Press.

Nwanze, Kanayo F (2017). A Bucket of Water: Reflections on sustainable rural development. Practical Action Publishing.

Satsangi, Prem Saran & Dhir, Arsh (2024). Role of Communities in Achieving Sustainable Development. Academic Foundation.

Paper Title: River Health

Paper code: GEOSPL25074

Credit: 4

Marks: 100

Course Objectives:

- Explore the concept of river health, emphasizing natural factors, human impacts, and the effects of climate change on river systems.
- Introduce assessment indices, bioassessment methods, and habitat characteristics crucial for evaluating river health and guiding management strategies.

Course Outcomes:

- Define and explain the concept of river health, considering natural and anthropogenic influences.
- Analyze the impact of climate, geology, hydrology, land use, pollution, and water extraction on river health.
- Evaluate physical indices such as hydrological regime and sediment transport as indicators of river health.
- Assess chemical parameters (pH, DO, nutrients, contaminants) and their implications for water quality in rivers.
- Discuss biological indicators including aquatic flora and fauna for assessing river health and ecological integrity.
- Describe different types of river ecosystems, their structural components, and ecological roles of riparian vegetation.
- Examine principles and strategies for river restoration, rehabilitation, and integrated water resources management (IWRM), considering community engagement and relevant national and international policies and laws.

Unit I: Introduction to River Health

Concept of river health

Natural factors: climate, geology, hydrology

Human impacts: land use, pollution, water extraction

Climate change and its effects on river systems

Unit II: Indices of river health assessment

Physical: Hydrological regime: flow patterns, sediment transport

Chemical: Water quality: parameters (pH, DO, nutrients, contaminants)

Biological: aquatic flora and fauna as indicators of river health

Bio assessment methods: macro invertebrates, fish, algae

Unit III: Riverine Habitat

Introduction to river ecosystems: structure and function

Physical and ecological characteristics

Types of Aquatic Ecosystem and Riparian Vegetation and ecological roles

Key concepts: river health, ecological integrity, ecosystem services

Unit IV: River Health Management and Policy

Principles of river restoration and rehabilitation

Community involvement and stakeholder engagement

National and international water laws and policies

Integrated water resources management (IWRM)

Recommended Reading

- Allan, J. D. (1995). Stream ecology: Structure and function of running waters. Springer Science & Business Media.
- Allan, J. D., & Castillo, M. M. (2007). Stream Ecology: Structure and Function of Running Waters.
- Barbour, M. T., Gerritsen, J., Snyder, B. D., & Stribling, J. B. (1999). Rapid bioassessment protocols for use in streams and rivers: Benthic macroinvertebrates and fish (Vol. 8). US Environmental Protection Agency, Office of Water.
- Bernhardt, E. S., & Palmer, M. A. (Eds.). (2011). Synthesizing streams and rivers: Limnology meets ecosystem science. Springer Science & Business Media.
- Davies, P. E., & Jackson, J. E. (2006). The Biological Condition Gradient: A Descriptive Model for Interpreting Change in Aquatic Ecosystems.
- Gregory, S. V., Boyer, K. L., & Gurnell, A. M. (2003). The ecology and management of wood in world rivers. American Fisheries Society Symposium, 37, 1-20.
- Petts, G. E., & Amoros, C. (1996). Fluvial hydrosystems. Springer Science & Business Media.
- Poff, N. L., & Zimmerman, J. K. H. (2010). Ecological Responses to Altered Flow Regimes: A Literature Review to Inform the Science and Management of Environmental Flows.
- Raven, P. H., & Johnson, G. B. (2016). Biology. McGraw-Hill Education.
- Riley, R. H., & Chester, E. T. (2007). Introduction to environmental forensics. Academic Press.
- Rosenberg, D. M., & Resh, V. H. (Eds.). (1993). Freshwater biomonitoring and benthic macroinvertebrates. Springer Science & Business Media.
- Ward, J. V., & Stanford, J. A. (1983). The serial discontinuity concept of lotic ecosystems. In Dynamics of lotic ecosystems (pp. 29-42). Springer, Dordrecht.
- Winterbourn, M. J., Rounick, J. S., & Cowie, B. (Eds.). (2000). New Zealand stream invertebrates: Ecology and implications for management. Springer Science & Business Media.

Paper Title: Anthropogenic Geomorphology

Paper code: GEOSPL25084

Credit: 4

Marks: 100

Course Objectives:

- Examine the interaction between human activities and geomorphological processes, focusing on anthropogenic impacts on landscapes.
- Explore the principles and strategies for managing and restoring landscapes affected by human activities in anthropogenic geomorphology.

Course Outcomes:

- Analyze the characteristics of the physical system in anthropogenic geomorphology and the ways human activities influence geomorphological processes.
- Evaluate indirect human impacts on the physical environment, considering urbanization, agriculture, and resource extraction.
- Discuss stages intensifying human impact on landscapes, from natural to anthropogenic modifications, and their implications for landscape ecology.

- Assess the effects of agricultural activities such as crop cultivation, horticulture, and water management on landscape morphology.
- Examine land use changes, soil sealing, and urban hydrology as significant factors influencing landscape change.
- Explore the geomorphological implications of infrastructure development like roads, railways, and forest management practices.
- Describe principles and techniques for landscape restoration and rehabilitation, focusing on mitigating the impacts of quarrying, mining, and other anthropogenic activities on landscapes.

Unit I: Introduction

Subject and system of Anthropogenic Geomorphology

Characteristics of physical system

Impact of human activities on geomorphological processes

Indirect human impact on physical system

Unit II: Anthropogenic geomorphology and landscape ecology

Stages intensifying human impact on landscape: Natural, slightly modified and semi-natural, Anthropogenic

Agricultural activity on landscape: crop cultivation and horticulture, wind erosion on large scale farming, water management

Cultivation on slope

Unit III: Developmental processes and Landscape Change

Land use changes and soil sealing

Urban hydrology and landscape change

Roads, railways, and their geomorphological implications

Forest management and its geomorphological effects

Deforestation and reforestation impacts

Unit IV: Resource Extraction and Landscape Restoration

Quarrying and construction impacts on landscapes

Geomorphological impacts of mining activities

Principles of landscape restoration and rehabilitation

Techniques for restoring degraded landscapes

Mitigation strategies for infrastructure-induced geomorphological changes

Recommended Reading

Bull, W. B., & McFadden, L. D. (1977). Human-induced changes in geomorphology. Geological Society of America.

Chorley, R. J., & Kennedy, B. A. (1971). Physical geography: A systems approach. Prentice-Hall.

Derbyshire, E. (2001). Geomorphology and global environmental change. John Wiley & Sons.

Goudie, A. S. (2000). Human impact on the natural environment. John Wiley & Sons.

Goudie, A. S. (2013). "The Human Impact on the Natural Environment: Past, Present, and Future."

- Gregory, K. J. (2006). "The Human Role in Changing Fluvial Systems: Retrospect and Prospect." *Geomorphology*.
- Hooke, R. LeB. (2000). "On the History of Humans as Geomorphic Agents." *Geology*.
- Owens, P. N., & Collins, A. J. (2006). *Soil erosion and sediment redistribution in river catchments: Measurement, modelling and management*. CABI.
- Phillips, J. D. (2010). *Human-induced geomorphic change: A practitioner's guide to prediction and management*. John Wiley & Sons.
- Rhoads, B. L., & Thorn, C. E. (1996). *The scientific nature of geomorphology: Proceedings of the 27th Binghamton symposium in geomorphology, held 27-29 September 1996*. John Wiley & Sons.
- Trimble, S. W. (2018). *Anthropogenic geomorphology: A guide to man-made landforms*. Springer.
- Turner, B. L., & Brush, S. B. (Eds.).(1987). *Comparative farm land tenure*. Johns Hopkins University Press.
- Warburton, J. (1999). *Land use and the causes of geomorphological change*. John Wiley & Sons.

Paper Title: Watershed Management

Paper code: GEOSPL25094

Credit: 4

Marks: 100

Course Objectives:

- Introduce students to the concept of watersheds, emphasizing their definition, significance, and management principles.
- Provide a comprehensive understanding of hydrological processes within watersheds and their management implications.

Course Outcomes:

- Define watersheds and explain their significance in managing water resources and ecosystem health.
- Describe the concept of watershed management and its objectives in sustainable development.
- Perform watershed delineation and characterize watershed properties, including land use and hydrological parameters.
- Analyze the water resource regions of India and their unique hydrological characteristics.
- Evaluate the impact of watersheds on local communities, including water availability, agriculture, and livelihoods.
- Explain the components of the hydrological cycle (precipitation, infiltration, evaporation, runoff) and their estimation techniques.
- Discuss various management practices for natural drainage in watersheds, including check dams, gully stabilization, and river training structures for sediment control.

Unit I: Introduction to Watersheds

Definition and significance of watersheds

Concept of watershed management

Watershed delineation and characteristics

Water resource region of India
Effect of watershed on the community

Unit II: Hydrological cycle and watershed processes

Precipitation: Effects on hydrological cycle
Infiltration: Factors, measures or estimation of infiltration
Evaporation: Factors, measures or estimation of evaporation
Runoff: Factors, Estimation of runoff
Groundwater: Occurrence, flow and interactions
Sediment transport and deposition

Unit III: Management of natural drainage in watershed

Check dams
Structures for gully stabilization
Stream bank erosion measures
River training: Embankment, spurs, artificial cutoff, bell bunds,
Pitch Island
River training for sediment control

Unit IV: Principles of Watershed Management

Integrated watershed management approach
Objectives of watershed management
Selection of watershed village
Equity issues for watershed policies
Benchmark survey
Land capability classification

Recommended Reading:

- Allan, J. D. (2004). Landscapes and riverscapes: The influence of land use on stream ecosystems. *Annual Review of Ecology, Evolution, and Systematics*, 35, 257-284.
- Bosch, J. M., & Hewlett, J. D. (1982). A review of catchment experiments to determine the effect of vegetation changes on water yield and evapotranspiration. *Journal of Hydrology*, 55(1-4), 3-23.
- Chow, V. T., Maidment, D. R., & Mays, L. W. (1988). *Applied hydrology*. McGraw-Hill.
- Das, M.M and Saikia, M.D. (2013). *Watershed Management*, PHI Learning Pvt. Ltd.
- Dunne, T., & Leopold, L. B. (1978). *Water in environmental planning*. W. H. Freeman.
- Frissell, C. A., Liss, W. J., Warren, C. E., & Hurley, M. D. (1986). A hierarchical framework for stream habitat classification: Viewing streams in a watershed context. *Environmental Management*, 10(2), 199-214.
- Hirsch, R. M., Moyer, D. L., & Archfield, S. A. (2010). Weighted regressions on time, discharge, and season (WRTDS), with an application to Chesapeake Bay river inputs. *Journal of the American Water Resources Association*, 46(5), 857-880.
- McCool, D. K., & Brown, L. C. (Eds.). (1997). *Watershed management: Balancing sustainability and environmental change*. Springer.
- McCuen, R. H. (2011). *Hydrologic analysis and design* (3rd ed.). Pearson.

Novotny, V., & Olem, H. (1994). Water quality: Prevention, identification, and management of diffuse pollution. Van Nostrand Reinhold.
Singh, V. P. (2008). Watershed hydrology. CRC Press.

Paper Title: Practical-IV

Paper Code: GEOSPL25104

Credit: 4

Marks: 100

Course Objectives:

- To understand and analyze the health of rivers using key water quality parameters and sediment analysis techniques.
- To apply watershed management principles in field settings, including mapping watershed characteristics and using areal sampling techniques for terrain analysis.

Course Outcomes:

- Analyze and interpret water quality parameters (pH, TDS, conductivity, DO, turbidity) to assess the health of rivers.
- Conduct grain-size analysis of sediment samples to understand sediment dynamics and river health implications.
- Demonstrate proficiency in delineating watersheds and mapping slope profiles to assess hydrological characteristics.
- Calculate basin area and stream discharge using field data and apply them in watershed management scenarios.
- Utilize GIS or other data analysis software to analyze data collected during fieldwork on Anthropogenic Activities and its impact on Geomorphological Resources.
- Prepare comprehensive group field reports that outline the relationships between human activities and geomorphological changes within selected study areas.
- Present findings effectively within the constraints of a concise, structured report format suitable for academic and professional contexts.

Unit I: River Health

- Water pH
- Total Dissolve Solid
- Water Conductivity
- Dissolve Oxygen
- Turbidity analysis
- Grain-size analysis

Unit II: Watershed Management

- Delineating and slope profile mapping of watershed
- Basin area and stream discharge
- Mapping watershed attributes
- Areal sampling techniques for terrain analysis

Unit III & IV: Field Work

The students, in consultation with assigned faculty, are required to collect data from a selected study area. The issues pertaining to Anthropogenic Activities and Its effect on Geomorphological Resources collected data should be analyzed in one of the data analysis software packages taught in the semester. Based on the collected data a group field reports covering the linkages between Human Anthropogenic Activity and Geomorphological Linkages needs to be prepared. A group report should be prepared within a page limit of 20, inclusive of everything.

Social Geography Specialization (B)

Semester II

Paper Title: Geography of North-East India

Paper Code: GEOADL15064

Credit: 4

Marks: 100

Course Objectives:

- Provide an in-depth understanding of the physical, demographic, and socio-economic characteristics of North-East India and Assam.
- Analyze the geographical and socio-economic dynamics of the Bodoland Territorial Region (BTR).

Course Outcomes:

- Understand the locational significance, physiographic divisions, and climate of North-East India.
- Analyze the drainage systems, vegetation, and soil types in North-East India.
- Study population growth, density, and composition in North-East India, including religious and ethnic aspects.
- Examine agricultural practices, industrial development, and transport in North-East India.
- Identify socio-economic disparities and biodiversity resources in North-East India.
- Comprehend the geographical features, climate, and significance of the Brahmaputra in Assam.
- Analyze the demographic and socio-economic dynamics of the Bodoland Territorial Region (BTR).

Unit I: North-East India

Locational significance of North East India

Physiographic divisions and climate of North East India

Drainage system, Vegetation and Soil types of North East India

Population growth, density, age-sex composition,

Composition: religious composition, ethnic composition

Unit II: Socio-economic traits of North-East India

Agricultural practices: Types of farming, major crops and distribution

Industrial development: Types of Industries, problems and prospects

Transport and communication,

Disparity in socio-economic development and problems

Resources and biodiversity

Unit III: Geography of Assam

Locational significance of Assam

Physiographic divisions and climate of Assam

Significance of Brahmaputra
Soil of Assam
Population growth and spatial distribution

Unit IV: Dynamics of BTR

Location and formation of BTR
Population growth, density, age-sex composition, caste composition, and religious composition
Literacy rate, Educational attainment level
Dependency ratio, work participation
Forest cover, National Park, Biodiversity

Suggested Readings:

Barad, Gomit K (2018). Geography of North East India. Pacific Books International.
Bhagabati, AK, Bora, AK & Kar, BK (2018). Geography of Assam. Rajesh Publications: New Delhi.
Bhakta, GP (1992). Geography of North-East India. Akashi Book Depot: Shillong.
Bhattacharyya, NN (2018). North East India, A Systematic Geography. Rajesh Publications: New Delhi.
Choudhury, RKD (2021). Demographic Scenario of the North East India. Concept Publishing Company Pvt. Ltd.
Devee, Geeta & Das, Puspanjalee (2018). North-East India: A Comprehensive Geography. EBH Publishers (India).
Saikia, Sailajananda; Nimasow, Gibji & Sora, Tage Rupa (2023). Unveiling the Mystique: Diversity in Geography of NE India. Notion Press.

Paper title: Advanced Remote Sensing and Geographic Information System

Course Code: GEOSPL15074

Total Credit: 4

Total Marks: 100

Unit I: Introduction to Hyper-spectral Imaging

What is Hyper-spectral Remote Sensing, Airborne Visible Infrared Imaging Spectrometer, Compact Airborne Spectrographic Imager-2, Compact High resolution Imaging Spectrographic Imager-2
Thermal Remote sensing; Radiant versus Kinetic Temperature, Black body radiation, Thermal Imaging, properties and mapping, Thermal remote sensing sensors
Advantages and limitations of Hyper-spectral Remote Sensing remote sensing

Unit II: Introduction to Microwave Remote Sensing

Passive and Active Microwave Remote Sensing

Radar Imaging; Frequency/Wavelength, Polarization, Viewing Geometry, Spatial resolution of Radar system, Speckle, Surface geometry and roughness, Dielectric properties.
Airborne versus space-borne Radars, Radar Systems
Advantages and disadvantage of Radar Remote sensing

Unit III: Digital Image processing

Categorization of Image Processing
Image Processing System
Digital Image and its formats
Header Information and display of digital Image
Pre-Processing: Radiometric, Geometric and other
Image enhancement, Transformation, and transformation

Unit IV: Programming language and AI in Remote Sensing and GIS

Introduction to Programming languages and computer system
Introduction to Artificial Intelligence and Machine Learning in RS and GIS
Google Earth engine, and Cloud computing
Automation in image processing: Earth science, Agriculture, Forestry, Hydrology and flood

Suggested Books:

- Bhatta B., 2018: Remote Sensing and GIS, Oxford
- Burrough, P.A. and McDonnel, R.A., 1998: Principles of Geographical Information Systems, Oxford University Press.
- Campbell J. B., 2007: Introduction to Remote Sensing, Guildford Press.
- Chauniyal, D.D. (2010): Sudur Samvedanevam Bhogolik Suchana Pranali, ShardaPustakBhawan, Allahabad.
- Jensen J. R., 2004: Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice Hall.
- Joseph, G. 2005: Fundamentals of Remote Sensing, United Press India.
- Lillesand T. M., Kiefer R. W. and Chipman J. W., 2004: Remote Sensing and Image Interpretation, Wiley. (Wiley Student Edition).
- Nag P. and Kudra, M., 1998: Digital Remote Sensing, Concept, New Delhi.
- Rees W. G., 2001: Physical Principles of Remote Sensing, Cambridge University Press.
- Sarkar, A. (2015): Practical Geography: A Systematic Approach. Orient Black Swan PrivateLtd., New Delhi.
- Singh R. B. and Murai S., 1998: Space-informatics for Sustainable Development, Oxford and IBH Pub.
- Wolf P. R. and Dewitt B. A., 2000: Elements of Photogrammetry: With Applications in GIS, McGraw-Hill.

Paper Title: Social Geography

Paper code: GEOSPL15084

Credit: 4

Marks: 100

Course Objectives:

- To introduce students to the fundamental concepts, theories, and approaches in Social Geography, emphasizing the interaction between society and geographical space.
- To explore social issues, inequalities, and problems within the context of geographical variations and spatial dynamics.

Course Outcomes:

- Define and describe Social Geography, its scope, evolution, and development in India, highlighting key approaches and theoretical frameworks.
- Analyze the concepts of society, social groups, and communities, examining their classifications, characteristics, and spatial variations.
- Evaluate the dynamics of social space, social structure, and social processes, illustrating their impact on geographical patterns and interactions.
- Examine social diversity, plurality, and social justice within different geographical contexts, assessing their implications for societal well-being.
- Discuss the influence of environmental factors on society and vice versa, exploring the reciprocal relationship between environment and social dynamics.
- Investigate social inequalities, stratifications, and geographical variations in caste, religion, and language composition across India.
- Critically analyze social problems such as poverty, juvenile delinquency, dowry system, child labor, alcoholism, drug abuse, social animosity, flood impacts, and human trafficking, considering their spatial and temporal variations.

Unit I: Fundamentals of Social Geography

Definition of Social Geography,

Content and Scope of Social Geography

Evolution of Social Geography,

Development of Social Geography in India

Approaches to Social Geography

Society: Definition, Characteristics, Elements, Types

Social Groups: Concepts, Classifications, Characteristics

Community: Concepts, Classifications, Characteristics, Elements

Unit II: Concepts and themes in Social Geography

Social Space, Social Structure, Social Process,

Social Organisations, Social Diversity and Plurality,

Social distance, Social Justice

Geography of Social Well-being, Social Pathology and Social Action

Effect of Environment on Society and Vice versa

Unit III: Social Inequality, Institutions and Controls

Social Differentiations and Social Stratifications

Geographical variations in Caste, Religion, Language Composition

Marriage System, Family System, Kinship System and their spatial variation in India
Social Controls: Meaning, Customs and Sanctions, Social Norms and Values, Conformity and Deviance

Unit IV: Social Problems with special reference to India

Concept of Social Problems and social disorganisation
Spatial variation in problems relating to poverty
Juvenile Delinquency and its spatio-temporal variation
Dowry System: Prevalence and measures
Child labour: causes and consequences
Alcoholism and Drugs abuse
Strategic location and social animosity
Flood and Human Trafficking

Suggested Readings:

- Ahmad, A. (1993). *Social Structure and Regional Development: A Social Geography Perspective*. Jaipur: Rawat Publications.
- Ahmad, A. (1999). *Social Geography*. Jaipur and New Delhi: Rawat Publications.
- Carter, J and Turner, J. (1989). *Social Geography: An Introduction to Contemporary Issues*. London: Edward Arnold.
- Carter, John and Trevor, J. (1989). *Social Geography: An Introduction to Contemporary Issues*. London: Edward Arnold.
- Eyles, J. (1983). *Social Geography in International Perspective*. Oxford: Basil Blackwell.
- Eyles, J. (1997). *Social Geography*. New York: The Dictionary of Human Geography.
- Gregory, D. and Urry, J. (1985). *Social Relation and Social Structure*. London: Macmillan.
- Hannett, C. (1996a). *Social Geography: A Reader*. London: Arnold.
- Hannett, C. (1996b). *Social Geography*. London: Arnold.
- Harvey, D. (1972). *Social Justice and the City*. London: Arnold.
- Jackson, P. and Smith, S. (1984). *Exploring Social Geography*. London: George Allen and Unwin (Publishers) Ltd.
- Jackson, P. and, & Smith, S. (1984). *Exploring social Geography*. London: George Allen and Unwin (Publishers) Ltd.
- Jones, E. and Eyles, J. (1977). *An Introduction to Social Geography*. Oxford and New York: Oxford University Press.
- Jones, E. (1975a). *Reading in Social Geography*. Oxford: Oxford University Press.
- Jones, E. (1975b). *Readings in Social Geography*. London: Oxford University Press.
- Keyness, M. (1972). *Social Geography: New Trends in Geography*. London: Open University Press.
- Milton, K. (1973). *Social Geography: New Trends in Geography*. London: Open University Press.
- Momsen, J. H. and Townsend, G. (1987). *Geography of Gender in the Third World*. London, New York: Hutchinson, State University of New York Press.
- Noble, A. G. and Dutta, A. K. (n.d.-a). *India: Cultural Pattern and Processes*. Colorado: West View Press.
- Noble, A. G. and Dutta, A. K. (n.d.-b). *India: Cultural Pattern and Processes*. Colorado: West View Press.

- Pecion, M. (1987). *Social Geography: Process and Prospect*. London: Croom Helm.
- Sharma, H. N. (2000). *Social Geography*. (J. Singh, Ed.). New Delhi: INSA.
- Sharma, H. N. (2001). *Social Geography: Progress in Geography*. New Delhi: INSA.
- Smith, D. M. (1977a). *Human Geography : A Welfare Approach*. London: Edward Arnold.
- Smith, D. M. (1979). *Where the Grass is Greener: Living in an Unequal World*. Victoria: Penguin Books Australia Ltd.
- Sopher, D. E. (1987). *An Exploration Of India: Geographical Perspectives on Society and Culture*. London: Longman.
- Srinivas, M. N. (1986). *India: Social Structure*. Delhi: Hindustan Publishing Corporation.
- Taher, M. (1994). *Social Geography: Concept and Theories*. Guwahati: NEIGS.

Paper Title: **Geography of Culture**

Paper code: GEOSPL15094

Credit: 4

Marks: 100

Course Objectives:

- To introduce students to the foundational concepts, theories, and approaches in Cultural Geography, focusing on the interaction between culture and geographical space.
- To explore the diversity of cultures, cultural change processes, and cultural landscapes across different geographical contexts.

Course Outcomes:

- Define and discuss the nature, scope, and development of Cultural Geography, including its approaches and theoretical foundations.
- Explain the concepts of culture, cultural traits, functions, and components, highlighting their significance in Cultural Geography.
- Analyze the evolution of Indian culture, tracing historical and contemporary changes and their geographical manifestations.
- Evaluate themes such as cultural diffusion, assimilation, interaction, cultural regions, and cultural ecology, illustrating their role in shaping cultural landscapes.
- Examine cultural lag, cultural hearths, folk culture, and the principles of behaviouralism and cultural relativism in the context of Cultural Geography.
- Investigate the components of Cultural Geography including race, spatial diffusion, and distribution of cultural traits globally and within specific regions like North East India.
- Discuss the relationship between livelihood patterns and culture, exploring livelihood adaptation strategies, economic activities, and their cultural adaptations, particularly in physiographically diverse regions such as North East India.

Unit I: Fundamentals of Cultural Geography

Definition, Nature and scope of cultural geography,

Approaches of Cultural Geography

Development of Cultural Geography

Concepts of Culture, its Traits, Functions and Components of Culture

Evolution of Indian culture

Cultural changes

Unit II: Themes and Concepts in Cultural Geography

Cultural Diffusion and Assimilation, Cultural Interaction
Cultural Area, Cultural Region, Cultural ecology, Cultural Landscape
Cultural Lag
Cultural Hearth
Folk Culture and geography
Behaviouralism and cultural relativism

Unit III: Components of Cultural Geography

Race: classification, Spatial Diffusion and distribution
Types and Pattern of World Cultural regions: Language, Religion, Ethnicity
Cultures and cultural regions in North East India in particular reference to religion
Geography of ethnic groups and tribal groups
Diffusion of ethnic traits in world as well as India

Unit -IV: Livelihood and Culture

Concept of livelihood, Livelihood Pentagon
Livelihood adaptation strategies
Patterns of livelihood: various economic activities & cultural adaptations
Livelihood Security and Cultural Security
Association of livelihood with physiography with special reference to North east India

Suggested Readings:

- Broek, J. C. and Webb, J. W. (1978). *A Geography of Mankind*. New York: McGraw Hill.
- Doreen, M. (2005). *For Space*, SAGE Publications Ltd.
- Duncan, J. and Ley, D. (1992). *Place/Culture/Representation*. London: Routledge
- Duncan, J. et al (2004). *A Companion to Cultural Geography*, Blackwell Publishing Ltd.
- Gritzer, Charion, F. (1984). 'The Scope of Cultural Geography', *Journal of Geography*. *Journal of Geography*, 65, 4–11.
- Jackson, Richard.H. and Hudman, L. E. (1990). *Cultural Geography*. New York: West Publishing Company.
- Noble, A. G. and Dutt, A. K. (1982). *India: Cultural Pattern and Processes*. Colorado: West View Press / Boulder.
- O. G. and Rowntree, L. (1998). *The Human Mosaic: A Thematic Interpretation in Cultural Geography*. London: University of Chicago Press.
- Thomas, W. L. (1959). *Man's Role in Changing the Face of the Earth*. Chicago: University of Chicago Press.
- Relph, E. (2022). *Place and Placelessness*, SAGE Publications Ltd.
- Timothy, S. O and Patricia L. P. (2008). *The Cultural Geography Reader*, Routledge 270 Madison Avenue, New York
- Michel, de C. (1988). *The Practice of Everyday Life*, University of California Press.
- Soja, E. W. (1996). *Thirdspace: Journeys to Los Angeles and Other Real-and-Imagined Places*, Wiley-Blackwell
- Pile, S. and Keith, M. (2013). *Geographies of Resistance*, Taylor and Francis
- Yi-Fu, T. (1996). *Cosmos and Hearth: A Cosmopolite's Viewpoint*, University of Minnesota

Press.

Yi-Fu, T. (2001) *Space and Place: The Perspective of Experience*, University of Minnesota Press.

Zelinsky, W. (1973). *The Cultural Geography of America*. Princeton: Princeton University Press.

Paper Title: Practical-II

Paper Code: GEOSPL15104

Credit: 4

Marks: 100

Course Objectives:

- To provide practical training in radar remote sensing and multispectral image analysis techniques for environmental and socio-cultural applications.
- To develop skills in qualitative and spatial data analysis methods for assessing socio-cultural traits and demographic indicators.

Course Outcomes:

- Proficiency in using the SNEP tool for radar image preprocessing and mapping of water bodies, soils, and vegetation using radar remote sensing.
- Competence in utilizing Google Earth Engine and QGIS for land cover classification, urban sprawl mapping, and generating heat and vegetation indices (NDVI and NDWI) from multispectral imagery.
- Ability to conduct qualitative data analysis through content analysis and grounded theory, applying Cresswell's visual model for coding qualitative data effectively.
- Understanding the concept of population-resource regions globally and the application of spatial analysis to assess demographic variations within specific regions like BTR (Bodoland Territorial Region).
- Capability to construct a Livelihood Pentagon using indicators to evaluate socio-economic conditions and livelihood patterns in designated geographical areas.
- Proficiency in mapping the distribution of healthcare centers and schools in BTR, and assessing spatial variations in urbanization levels across Assam.
- Skill in measuring spatial disparities in literacy rates, work participation, and mapping the spatial patterns of tribal population distribution, religion, and language across India

Unit-I: Application of Radar Remote Sensing:

- Familiarizing SNEP tool
- RADAR image preprocessing
- Water body mapping
- Soil mapping
- Vegetation mapping

Unit-II: Application of Multispectral image

- Familiarizing Google Earth Engine/QGIS
- Land Cover classification

- Urban sprawl mapping
- Heat and thermal mapping
- NDVI and NDWI

Unit III: Socio-Cultural Traits

- Analysis of Qualitative data: Content analysis, Grounded theory
- Cresswell's (2008) visual model of coding process
- Population- Resource Regions of the World
- Assessment of spatial variation in demographic indicators in BTR
- Preparation of Livelihood Pentagon with indicators

Unit IV: Measuring socio-cultural Index

- Mapping of distribution of Healthcare centres and Schools in BTR
- Measuring the spatial variation in the level of Urbanisation in Assam
- Measuring Spatial Disparity in literacy and Work participation in BTR
- Mapping the Spatial Pattern of Tribal Population in India
- Distribution Pattern of Religion and Language in India

Semester: III

Social Geography Specialization (B)

Paper title: Settlement Geography

Course Code: GEOSPL 25014

Credits: 4 Marks: 100

Course Objectives:

- To provide a comprehensive understanding of settlement geography, focusing on the origins, types, patterns, and spatial dynamics of human settlements.
- To explore theoretical frameworks and models in settlement geography to analyze the spatial organization and functional aspects of settlements.

Course Outcomes:

- Describe the scope and definition of settlement geography, including the evolution and growth of human settlements over time.
- Analyze different types of settlements, their spatial patterns, and house types, considering factors such as site and situation in settlement planning and development.
- Explain the rural-urban continuum and dichotomy, and classify settlements based on their functional roles and cultural characteristics, referencing classifications by Ashok Mitra, Mukherjee, and Census 1991.
- Understand key theoretical models in settlement geography such as the Rank Size Rule, Primate City Model, and Central Place Theory, and apply these models to explain settlement hierarchies and spatial patterns.
- Discuss urbanization processes globally and in India, including the dynamics of urban sprawl, urban fringe development, and the formation of urban agglomerations.

- Evaluate the causes and implications of slums and squatter settlements, analyzing the socio-economic factors contributing to their development and the associated challenges.
- Assess urbanization trends, urbanism, and the challenges of urban planning, considering both physical and social environmental impacts in urban areas globally and within India.

Unit I: Fundamentals of Settlement Geography

Definition and scope of settlement geography

Origin and growth of settlements

Settlement types, Pattern and house types

Concept of site and situation in settlement geography

Tribal settlements of Western, Central and North East India

Unit II: Classification of settlements

Rural- urban relationship: dichotomy and continuum

Classification of settlement based on Rural(functional), Urban (Culture, stages of growth and Decay, functional classification of urban centers and Indian Cities-Ashok Mitra, Mukherjee and others, Census 1991).

Unit III: Theory and models in Settlement Geography

Rank Size Rule, Primate City Model, Central Place Theory

Concentric zone model, Sectorial Model, Multiple Nuclei Model

Unit IV: Urbanization, Urbanism and the City

Process of Urbanization and Urbanism

Urban sprawl, Urban fringe, and Urban Agglomeration

Slums and squatter: Cause and factors of its development and associated problems

Urbanization, Urbanism, Urban planning and its challenges; Physical and social Environment

Urbanization in India/World

Suggested Readings:

Bhende, A. A., & Kanitkar, T. (2019). *Principles of Population Studies*. Himalaya Publishing House.

Chandna, R. C. (2015). *Geography of Population*. Kalyani Publishers.

Hassan, M.I. (2007). *Population Geography*. Rawat Publications.

Hussain, J. (2021). *Settlement Geography*. Notion Press.

Husain, M. (2016). *Modells in Geography*. Rawat Publications.

Husain, M. (2021). *Human Geography*. Sixth Edition. Rawat Publications.

Ghosh, S. (2015). *Introduction to Settlement Geography*. Orient Blackswan

Khullar, D.R. (2018). *India, A comprehensive Geography*. Kalyani Publishers.

Lundquist, J.H., Anderton, D.L., & Yaukey, D. (2015). *Demography, The Study of Human Population*. Fourth Edition. Waveland Press, Inc.

Newbold, K.B. (2017). *Population Geography: Tools & Issues*. Rawat Publications.

Ram, F. & Pathak, K. B. (1998). *Techniques of Demographic Analysis*. Himalaya Publishing House.

Singh, R.Y. (2002). *Geography of Settlements*. Rawat Publications.

Tiwari, R.C. (2020). *Settlement Geography, Rural and Urban Settlements*. Pravalika publication.

Paper Title: Social Dynamics and Change

Paper Code: GEOSPL 25024

Credits: 4 Marks: 100

Course Objectives:

- Understand the dynamics of social change across different spatial and historical contexts.
- Analyze the impact of globalization, technological advancements, and social movements on contemporary societies.

Course Outcomes:

- Explain the historical perspectives and theories of social change including conflict theory, functionalism, and symbolic interactionism.
- Evaluate regional disparities and inequalities within societies using geographical perspectives.
- Describe processes of social evolution in India, including Sanskritization, Westernization, and Modernization.
- Analyze the roles of urbanization and industrialization in shaping social dynamics.
- Assess the emergence and types of social movements such as reformist, revolutionary, and resistance movements.
- Examine the influence of globalization on climate change, environmental degradation, and social vulnerability.
- Critically discuss the role of technology in both shaping and being shaped by social dynamics.

Unit I: Introduction to Social Dynamics

Definition and Scope of Social Dynamics

Historical Perspectives on Social Change

Social Forces and Factors Influencing Change

Spatial Patterns of Social Dynamics and Social Change

Theories of Social Dynamics: Conflict theory, Functionalism, Symbolic Interactionism

Regional Disparities and Inequalities in terms of society

Unit II: Geographies of Social Change

Social evolution in India: The pre-history and historic scene (Janapadas and Mughal Subahs)

Processes of social change in India: Sanskritization, Westernization and Modernization

Social groups, social structure and social development: an international perspective

Processes of social change: urbanization, industrialization

Residential Segregation and Mobility

Unit III: Social Movements and Collective Action

Understanding Social Movements

Types of Social Movements: Reformist, Revolutionary, Resistance

Factors contributing to the Emergence of Social Movements

Social Change among Urbanites

Case Studies on Social Movements: Assam movement, Bodoland movement

Unit IV: Globalization and Social Dynamics

Climate Change and Social Vulnerability
Environmental Degradation and Social Conflict
Sustainable Development and Social Justice
Transnationalism and Cultural Hybridity
Social Movements in a Globalized World
Geopolitical Shifts and Power Dynamics
The Role of Technology in Social Dynamics
Technological Determinism vs. Social Shaping of Technology

Suggested Readings:

- Ahmad, A. (1993). *Social Structure and Regional Development: A Social Geography Perspective*. Jaipur: Rawat Publications.
- Ahmad, A. (1999). *Social Geography*. Jaipur and New Delhi: Rawat Publications.
- Carter, J and Turner, J. (1989). *Social Geography: An Introduction to Contemporary Issues*. London: Edward Arnold.
- Carter, John and Trevor, J. (1989). *Social Geography: An Introduction to Contemporary Issues*. London: Edward Arnold.
- Eyles, J. (1983). *Social Geography in International Perspective*. Oxford: Basil Blackwell.
- Eyles, J. (1997). *Social Geography*. New York: The Dictionary of Human Geography.
- Gregory, D. and Urry, J. (1985). *Social Relation and Social Structure*. London: Macmillan.
- Hannett, C. (1996a). *Social Geography: A Reader*. London: Arnold.
- Hannett, C. (1996b). *Social Geography*. London: Arnold.
- Harvey, D. (1972). *Social Justice and the City*. London: Arnold.
- Jackson, P. and Smith, S. (1984). *Exploring Social Geography*. London: George Allen and Unwin (Publishers) Ltd.
- Jackson, P. and, & Smith, S. (1984). *Exploring social Geography*. London: George Allen and Unwin (Publishers) Ltd.
- Jones, E. and Eyles, J. (1977). *An Introduction to Social Geography*. Oxford and New York: Oxford University Press.
- Jones, E. (1975a). *Reading in Social Geography*. Oxford: Oxford University Press.
- Jones, E. (1975b). *Readings in Social Geography*. London: Oxford University Press.
- Keyness, M. (1972). *Social Geography: New Trends in Geography*. London: Open University Press.
- Milton, K. (1973). *Social Geography: New Trends in Geography*. London: Open University Press.
- Momsen, J. H. and Townsend, G. (1987). *Geography of Gender in the Third World*. London, New York: Hutchinson, State University of New York Press.
- Noble, A. G. and Dutta, A. K. (n.d.-a). *India: Cultural Pattern and Processes*. Colorado: West View Press.
- Noble, A. G. and Dutta, A. K. (n.d.-b). *India: Cultural Pattern and Processes*. Colorado: West View Press.
- Pacion, M. (1987). *Social Geography: Process and Prospect*. London: Croom Helm.
- Sharma, H. N. (2000). *Social Geography*. (J. Singh, Ed.). New Delhi: INSA.
- Sharma, H. N. (2001). *Social Geography: Progress in Geography*. New Delhi: INSA.

- Smith, D. M. (1977a). *Human Geography : A Welfare Approach*. London: Edward Arnold.
- Smith, D. M. (1979). *Where the Grass is Greener: Living in an Unequal World*. Victoria: Penguin Books Australia Ltd.
- Sopher, D. E. (1986). *An Exploration Of India: Geographical Perspectives on Society and Culture*. London: Longman.
- Sopher, D. E. (1987). *An Exploration Of India: Geographical Perspectives on Society and Culture*. London: Longman.
- Srinivas, M. N. (1986). *India: Social Structure*. Delhi: Hindustan Publishing Corporation.
- Taher, M. (1994). *Social Geography: Concept and Theories*. Guwahati: NEIGS.

Paper Title: Geography of Social Well-being

Paper Code: GEOSPL25034

Credit: 4

Marks: 100

Course Objectives:

- Explore the dimensions, theoretical frameworks, and indicators of social well-being across different cultural contexts.
- Analyze the factors influencing social well-being, including family dynamics, community engagement, economic status, and access to resources.

Course Outcomes:

- Define and discuss the dimensions of social well-being and analyze their interrelationships.
- Apply theoretical frameworks such as Maslow's Hierarchy of Needs and subjective well-being to understand social well-being.
- Evaluate the impact of family and social relationships on individuals' well-being.
- Assess the role of community engagement and social cohesion in promoting social well-being.
- Analyze how economic status, education, and social support influence health outcomes within communities.
- Discuss the importance of green spaces and community health in enhancing overall well-being.
- Examine global challenges to social well-being, including climate change, pandemics, and inequality, and their implications for public health and policy.

Unit I: Introduction to Social Well-being

Definition and Dimensions of Social Well-being

Theoretical Frameworks: Maslow's Hierarchy of Needs, Subjective Well-being

Indicators of Social Well-being: Health, Education, Income, Social Support

Cultural and Contextual Influences on Social Well-being

Unit II: Factors Influencing Social Well-being

Family and Social Relationships

Community Engagement and Social Cohesion
Effects of economic Status, Education, and Social Support on Health
Access to Resources and Opportunities
Green Spaces and Community Health

Unit III: Social Well-being and Contemporary Challenges

Enhancing Social Well-being: Mental Health Programs, Education Initiatives
Empowerment and Capacity Building
Advocacy and Social Justice
Building Resilience and Coping Strategies
Global Challenges to Social Well-being: Climate Change, Pandemics, and Inequality
Technology and Social Well-being

Unit IV: Aging and Well-being

Definitions and concepts of aging
Demographic trends in aging populations worldwide
Relationship between aging and social well-being
Social support: Concept, Types of social support: emotional, instrumental
Family dynamics and intergenerational relationships
Community-based support services and programs for older adults
Technology and its role in enhancing social connections among older adults

Suggested Readings:

Allin, P. and Hand, D. J. (2014). *The Wellbeing of Nations: Meaning, Motive and Measurement*, Blackman, T. (2006). *Placing Health: Neighborhood Renewal, Health Improvement and* Blackwell.
Byrne, D.S. and Ragin, C. C. (Eds.) (1977). *The Geographies of Inequality: Social and Spatial Complexity*, Policy Press.
Diener, E. Oishi, S. & Tay, L. (2018). *Handbook of Social Well-Being*, UT: DEF Publishers. Divisions in Society, Oxford University Press.
Gatrell, A. C. and Elliott, S. J. (2014). *Geographies of Health: An Introduction*, Wiley- John Wiley & Sons Inc.
Knox, P. (1995). *Social Well-being: A Spatial Perspective*. Oxford: Oxford University Press.
Smith, D. M. (1973). *A Geography of Social Well-being*. New York: McGraw Hill.
Vincent J. Del Casino Jr. (2009). *Social Geography: A Critical Introduction*, Wiley-Blackwell.

Paper Title: Population and Resource Interface

Paper Code: GEOSPL25044

Credit: 4

Marks: 100

Course Objectives:

- Explore the complex interrelations between population dynamics and development across various dimensions including demographic transitions, resource management, environmental impacts, and policy interventions.

- Analyze diverse perspectives on population and development, from pessimist to optimist viewpoints, and their implications for policy and practice.

Course Outcomes:

- Explain the effects of development on demographic variables such as demographic transition, age structure, fertility, and mortality rates.
- Compare and contrast pessimist, optimist, and neutralist views regarding the relationship between population growth and development outcomes.
- Evaluate modern theories of population and development, including Malthusianism, Marxian perspectives, and the Tragedy of the Commons theory.
- Describe the concept of natural, capital, and human resources and their quantitative and qualitative aspects in relation to population dynamics.
- Assess the implications of population growth on essential sectors such as food security, sanitation, housing, employment, education, and health.
- Analyze the ecological and environmental dimensions of sustainable development and various approaches to environmental management.
- Discuss different population policies worldwide, including pro-natalist and anti-natalist strategies, and evaluate their impacts on fertility, mortality, migration, and special groups such as women, children, youth, and the aged.

Unit I: Linkages of Population on Development

Effect of development on demographic variables: Demographic transition, age structure transition, Declines of fertility and mortality.

Divergent views regarding the relationship between population and development: pessimist, optimist, and neutralist.

Modern theories of population and development: Malthus, Marx, Ricardo theory and their implications, Tragedy of Commons, Limit to growth Study

Unit II: Population and Resources

Concept of Natural resources, Capital Resources and Human Resources

Quantitative aspects of Human Resource: concepts of labour force, economically active population, unemployment and types of unemployment: disguised, seasonal frictional and chronic.

Qualitative aspects of Human Resource: factors influencing productivity of human beings

Implications of population growth on food, sanitation, housing, employment, education, and health

Unit III: Population and Environment

Ecological and environmental dimensions of sustainable development;

Approaches to environment: Gandhian approach, Marxian/Socialist approach;

Linkage between Population growth and climate change;

Pressure of population growth on water resources, land use, soil erosion, desertification;

Environmental degradation and its implications for health

Unit IV: Population Policies

Definition of Population Policy; Principal features of a population policy;

Population Policies of Pro-natalist and Anti-Natalist Countries
Fertility, Mortality, and Migration influencing policies
Policies and programmes for special groups: women and children, youth and aged;
National Population Policy 2000, National Health Policy 2002, and National Health Mission
2013

Suggested Readings:

- Agarwala, S. N. (1986). *India's Population Problems* (3rd ed.). McGraw-Hill Education.
- Ahmad, A., Noin, D., & Sharma, H. N. (Eds.). (1997). *Demographic Transition: The Third World Scenario*. Rawat Publications.
- Beaujeu-Garnier, J., & Beaver, S. H. (1966). *The Geography of Population*. Longman.
- Bhende, A. A., & Kanitkar, T. (1978). *Principles of Population Studies*. Himalaya Publishing House.
- Birdsall, N., Kelley, A. C., & Sinding, S. (Eds.). (2003). *Population Matters: Demographic Change, Economic Growth and Poverty in the Developing World*. Oxford University Press.
- Bloom, D. E., Sevilla, J., & Canning, D. (2003). *The Demographic Dividend: New Perspective on Economic Consequences Population Change*. RAND Corporation.
- Chandna, R. C. (2015). *A Geography of Population*. Kalyani Publishers.
- Chee, S., House, W. J., & Lewis, L. (1999). Population policies and programmes in the post-ICPD era: can the Pacific Island countries meet the challenge? *Asia-Pacific Population Journal*, 14(1), 3–20. <http://www.ncbi.nlm.nih.gov/pubmed/12295289>
- Chenery, H., & Srinivasan, T. N. (Eds.). (1988). *Handbook of Development Economics Vol. 1*. North-Holland.
- Clarke, J. I. (1971). *Population Geography and Developing Countries*. Pergamon Press.
- Clarke, J. I. (2013). *Population Geography* (W. B. Fisher (Ed.); 2nd ed.). Pergamon Press.
- Demko, G. J., Rose, H. M., & Schnell, G. A. (Eds.). (1970). *Population Geography: A Reader*. McGraw Hill.
- Gosal, G. S. (1984). Population Geography in India. In J. I. Clarke (Ed.), *Geography and Population: Approaches and Applications*. Pergamon Press.
- Haq, M. ul. (1996). *Reflections on Human Development*. Oxford University Press.
- Jamison, D. T., Breman, J. G., Measham, A. R., Alleyne, G., Claeson, M., Evans, D. B., Jha, P., Mills, A., & Musgrove, P. (Eds.). (2006). *Disease Control Priorities in Developing Countries* (2nd ed.). Oxford University Press.
- Kapila, R., & Kapila, U. (2001). *India's Economy in the Twenty First Century: Challenges and Opportunities*. Academic Foundation.
- Kawadia, G., & Ahuja, K. (2006). *Environmental Issues of Development*. Associated Publishers.
- Mehta, S. (1990). *Migration: A Spatial Perspective (A Case Study of Bist Doab-Punjab)*. Rawat Publications.
- National Research Council. (1986). *Population Growth and Economic Development: Policy Questions*. National Academic Press.
- Peabody, J. W., Rahman, M. O., Gertler, P. J., Mann, J., Farley, D. O., & Luck, J. (1999). *Policy and Health: Implication for Development in Asia*. Cambridge University Press.
- Peters, D. H., Yazbeck, A. S., Sharma, R. R., Ramana, G. N. V., Pritchett, L. H., & Wagstaff, A. (2002). *Better Health Care Systems for India's Poor: Findings, Analysis, and Options*. World Bank Publications.
- Pickin, C., & Leger, S. St. (1992). *Assessing Health Need Using Life Cycle Framework*. Open

- University Press.
- Ray, D. (1998). *Development Economics*. Princeton University Press.
- Raza, M., & Ahmad, A. (1990). *An Atlas of Tribal India*. Concept Publishing Company.
- Robinson, H. (1983). *Population and Resources*. Palgrave Macmillan.
- Sen, A. (2002). The Concept of Development. In C. Hollis & T. N. Srinivasan (Eds.), *Handbook of Development Economics Vol. 1*. Elsevier.
- Todaro, M. P. (1989). *Economic Development in the Third World*. Longman.
- Trewartha, G. T. (1969). *A Geography of Population: World Pattern*. John Wiley & Sons Inc.
- UNESCAP. (1988). *Asia Pacific Population Policies and Programmes: Future Directions*. UN.
- United Nations. (1973). *The Determinants and Consequences of Population Trends Vol. 1*.
- United Nations. (1974). World Population Plan of Action from the United Nations World Population Conference, Bucharest, August 19-30, 1974. *The Department of State Bulletin*, 1–14. <http://www.ncbi.nlm.nih.gov/pubmed/12229766>
- United Nations. (1998). *National Population Policies*. Department of Economic and Social Affairs, UN.
- United Nations Development Programme. (2006). *Human Development Report 2006*. UN. <https://doi.org/10.18356/334c604b-en>
- Woods, R. (1979). *Population Analysis in Geography*. Longman.
- Zelinsky, W. (1966). *A Prologue to Population Geography*. Prentice-Hall.

Paper Title: Practical-III

Paper Code: GEOSPL25054

Credit: 4

Marks: 100

Course Objectives:

- Explore the methodologies and tools used in settlement geography, social indicators, social change, and development measurement.
- Analyze and apply various quantitative and qualitative indicators to assess settlement patterns, social well-being, social change, and development across different geographical contexts.

Course Outcomes:

- Utilize nearest neighbor analysis, network analysis, and distance decay to analyze settlement hierarchies, organization, and patterns.
- Develop and implement survey schedules to measure dimensions of social well-being using quantitative indicators such as income, employment, health, and qualitative indicators like life satisfaction and mental health.
- Calculate and interpret measures of fertility (CBR, GFR, ASFR, TFR) and mortality (CDR, ASDR, IMR, MMR) to understand demographic dynamics.
- Apply measures of social change (relative, absolute, spatio-temporal) to analyze selected indicators and map significant geographical features like sea routes and autonomous movements.
- Construct and interpret development indices such as PQLI, HDI, and GDI to assess regional and global development disparities.

- Calculate dependency ratios (child and old age) and classify labor to analyze demographic and economic structures.
- Use disparity indices, Z-scores, and PCA to measure and analyze disparities in development outcomes and aging trends.

Unit I: Settlement Geography

- Hierarchy
- Organization and pattern
- Nearest Neighbor Analysis
- Network analysis
- Distance Decay

Unit II: Indicators and Measurement

- Developing questions, rating and ranking Scale by using Quantitative indicators (income, employment, health statistics, education levels) and Qualitative indicators (life satisfaction, sense of community, mental health)
- Designing survey schedule to measure different dimensions of social well-being
- Measures of fertility: CBR, GFR, ASFR, TFR
- Measures of mortality: Crude Death Rate, Age Specific Death Rate (ASDR), IMR, MMR

Unit III: Measures of Social change

- Change: Relative, Absolute, Spatio-Temporal (selective indicators)
- Mapping of major sea routes around: South China Sea, Suez Canal, Panama Canal
- Mapping of strategically significant areas between India and its neighbours: India-Pakistan, India-Bangladesh, India-Sri Lanka, India-China
- Mapping of Geography of Autonomous Movement in India

Unit IV: Measures of Development

- Construction of Development Indices
- Physical Quality of Life Index (PQLI), Human development index (HDI), Gender Development Index (GDI)
- Dependency Ratio: Child dependency ratio, old age dependency ratio
- Classification of labor
- Disparity Index, Z-Score, PCA
- Measures of Aging

Suggested Readings:

Bhende, A. A., & Kanitkar, T. (1978). *Principles of Population Studies*. Himalaya Publishing House.

Caldwell, J. C. (1990). What do we know about health transition: The cultural, social and behavioural determinants of health. In *The Proceedings of an International Workshop, Vol. 1 & 2*. Health Transition Centre, Australian National University.

Mishra, B. D. (1981). *An Introduction to the Study of Population*. South Asian Publishers, Pvt. Ltd.

Park, K. (2021). *Text Book of Preventive and Social Medicine* (26th ed.). Banarsidas Bhanot Publishers.

- Ram, F., & Pathak, K. B. (1998). *Techniques of Demographic Analysis*. Himalaya Publishing House.
- Robinson, G. M. (1998). *Methods and Techniques in Human Geography*. Chichester: John Wiley & Sons.
- Siegel, J. S., & Swanson, D. A. (2004). *The Methods and Materials of Demography* (2nd ed., pp. 371–405, 407–428, 429–453). Elsevier Academic Press.
- Srinivasan, K. (1998). *Basic Demographic Techniques and Applications* (pp. 59–85). Sage Publications.
- United Nations. (1973). *Determinants and Consequences of Population Trends, Vol. 1* (pp. 96–104). UN.
- Yeats, M. (1974). *An Introduction to Quantitative Analysis in Human Geography*. New York: McGraw, Hill.
- United Nations (2017). Handbook on Measuring International Migration through Population Censuses. Department of Economic and Social Affairs Statistics Division
- United Nations (). Manual VI, Methods of Measuring Internal Migration. Department of Economic and Social Affairs, Population Studies No. 47

Semester: IV

Social Geography Specialization (B)

Paper Title: Environment and Sustainable Development

Course code: GEOSPL25064

Credits: 4

Marks: 100

Course Objectives:

- Provide a comprehensive understanding of environmental concepts and sustainable development principles, emphasizing their interrelationships.
- Explore global environmental issues and sustainable development goals (SDGs), focusing on their significance, challenges, and implementation strategies.

Course Outcomes:

- Explain the components and types of environment, and analyze human-environment interactions.
- Describe the principles and pillars of sustainable development and discuss their application in economic, social, and environmental contexts.
- Evaluate causes, impacts, and mitigation strategies related to climate change.
- Assess biodiversity loss, its consequences, and conservation measures.
- Identify types, sources, impacts, and control measures of pollution.
- Analyze resource depletion, types of natural resources, and strategies for sustainable management.
- Discuss selected SDGs relevant to geography, including their objectives, challenges in implementation, and roles of stakeholders like governments, NGOs, and international organizations.

Unit I: Introduction to Environment and Sustainable Development

Concept of Environment: Definition, components, and types of environment, Human-environment interactions

Concept of Sustainable Development: Definition and history - Principles and pillars of sustainable development (economic, social, and environmental)

Unit II: Global Environmental Issues

Climate Change: - Causes, impacts, and mitigation strategies

Biodiversity Loss: - Causes, impacts, and conservation strategies

Pollution: - Types, sources, impacts, and control measures

Resource Depletion: - Types of natural resources, overexploitation, and sustainable management

Unit III: Sustainable Development Goals (SDGs)

Overview of SDGs: - History and significance of the SDGs - Detailed study of selected SDGs relevant to geography

Implementation and Monitoring: - Strategies for achieving SDGs - Role of governments, NGOs, and international organizations

Unit IV: Human-Environment Interactions

Land Use and Land Cover Change: - Causes, impacts, and sustainable management

Urbanization and Environment: - Impacts of urbanization on the environment and sustainable urban planning

Agriculture and Environment: - Sustainable agricultural practices and their environmental impacts

Energy and Environment: - Renewable and non-renewable energy sources, and sustainable energy strategies

Suggested Reading:

Cunningham, William and Cunningham, Mary (214). Environmental Science: A Global Concern. McGraw Hill-Education.

Brundtland, G.H. (1987). Our Common Future: Report of the World Commission on Environment and Development. Geneva, UN-Dokument A/42/427

Devaki, N (2019). Education for Sustainable Development. Shanlax Publications.

Fulekar, MH & Dubey, Shanker (2023). Climate Change and Sustainable Development. CRC Press.

Gope, Arjun; Sarkar, Abhijit; Sarkar, Prasamita; Majumder, Santanu & Gosai, Kuldip (2019). Environmental Issues & Sustainable Development. Notion Press.

Nwanze, Kanayo F (2017). A Bucket of Water: Reflections on sustainable rural development. Practical Action Publishing.

Satsangi, Prem Saran & Dhir, Arsh (2024). Role of Communities in Achieving Sustainable Development. Academic Foundation.

Paper Title: Health Geography

Paper Code: GEOSPL25074

Credit: 4

Marks: 100

Course Objectives:

- Examine the concepts, determinants, and healthcare systems in health geography, with a focus on India's health scenario and healthcare programs.

- Analyze the socio-economic, environmental, and cultural factors influencing health outcomes and healthcare access in India.

Course Outcomes:

- Define and apply various approaches to studying health geography, including cartographic, behavioural, ecological, welfare, and geographic approaches.
- Describe the concepts of health, disease, morbidity, prevalence, incidence, and the International Classification of Diseases (ICD).
- Evaluate geographical determinants such as climate, altitude, water quality, air quality, and natural disasters on health outcomes.
- Analyze socio-economic determinants like income, education, workspaces, and socio-cultural factors including dietary habits, beliefs, gender roles, and social support systems affecting health in India.
- Discuss epidemiological transitions and lifestyle diseases prevalent in India such as obesity, hypertension, and diabetes.
- Explain the three-tier healthcare system in India (primary, secondary, tertiary) and the norms for healthcare facilities (Sub-Centre, PHC, CHC, District Hospital).
- Assess healthcare delivery mechanisms, traditional and alternative medicine systems, health seeking behaviour, and the burden of disease in India.

Unit I: Concepts

Defining Health Geography; Approaches to study Health Geography: Cartographic, Behavioural, Ecological, Welfare, and Geographic approach
 Concept of Health, its measurement and data source
 Concept of disease: Communicable and non-communicable diseases
 Concept of Morbidity, prevalence and incidence of diseases
 International Classification of diseases
 Healthcare belief model

Unit II: Health scenario in India

Geographical Determinants of health: Climate, Altitude, Water quality, Air Quality, Natural Disaster
 Socio-Economic determinants of health: Income, Education, and Work spaces
 Socio-Cultural determinants of health: Dietary habits and preferences, Beliefs and Cultural Practices, Gender Role, Social Support System
 Epidemiological transition in India
 Dietary habit and nutritional level
 Out of pocket expenditure on healthcare
 Life style disease: Obesity, Hypertension, Diabetes
 Socio-economic and Environmental determinants of health

Unit III: Healthcare system in India

Three tier system of healthcare: Primary, Secondary and Tertiary
 IPHS norm for Sub-Centre, Primary Health Centre, Community Health Centre, District Hospital
 Healthcare delivery mechanism
 Traditional and Alternative medicine system

Health seeking behavior
Burden of disease in India
Spatial analysis of healthcare access: Accessibility, Availability, Affordability, and Acceptability

Unit VI: Healthcare programs in India

Importance of health Insurance
Malaria, Tuberculosis
National Health Mission 2013
Janani Shishu Suraksha Karyakarm (JSSK)
National Programme on Climate Change & Human Health
Roles and Responsibilities of ASHA and Anganwadi Workers
National Vector Borne Diseases Control Programme
Kayakalp (Extension of Swach Bharat Abhiyan)
Pradhan Mantri National Dialysis Programme (PMNDP)
National Programme on Climate Change & Human Health

Suggested Readings:

Izhar, Nilofar (2011). Introduction to Geography of Health, in Nilofar Izhar (ed) Geography and Health, A study in Medical Geography, APH Publishing Corporation, New Delhi.
Misra, RP (2007). Geography of Health, A treatise on Geography of life and death in India. Concept Publishing Company, New Delhi.
Rajput, Swati (2024). Geography of Health. Concept Publishing Company Pvt. Ltd. New Delhi.
Thamilarasan, M (2016). Medical Sociology. Rawat Publications, New Delhi.

Paper Title: Gender Geography

Course Code: GEOSPL25084

Credit: 4

Marks: 100

Course Objectives:

- Explore the concepts, theories, and historical perspectives of gender geography, focusing on the intersectionality of gender with race, class, and sexuality.
- Analyze the spatial dimensions of gender, including gendered divisions of space, power dynamics, representation, and the impacts of globalization and development on gendered landscapes.

Course Outcomes:

- Define and discuss key concepts in gender geography such as patriarchy, matriarchy, masculinities, queer geographies, and feminist perspectives.
- Evaluate historical and theoretical perspectives on gender and space, highlighting the evolution of feminist geographies and their contributions.
- Analyze gendered divisions of space in urban, rural, and suburban environments, and assess the role of architecture and urban planning in shaping gendered experiences.
- Examine the gendered experiences of mobility, transportation, and the division of labor within domestic spaces.

- Critically analyze media representations of gender and place, and explore gendered landscapes of political power and activism.
- Discuss indigenous perspectives on gender and land, highlighting the intersection of culture, identity, and geography.
- Assess the gendered impacts of globalization and neoliberalism on landscapes, livelihoods, and national policies, and analyze the role of gender audits and gender budgets in addressing gender disparities.

Unit I: Introduction to Gender Geography

Definitions and concepts of gender geography

Historical and theoretical perspectives on gender and space

Intersectionality with race, class, and sexuality in geographical contexts

Concepts on feminist geographies, masculinities, queer geographies

Concept of Patriarchy, Matriarchy, Matriliney and Matrilocality

Unit II: Gendered Spaces and Places

Gendered divisions of space in urban, rural, and suburban environments

Gender and the built environment: architecture, urban planning

Gendered experiences of mobility and transportation

Domestic spaces and the gendered division of labor within the home

Case studies examining gendered spaces and places across different geographical contexts

Unit III: Power, Representation, and Identity

Gender, power, and representation in geographical discourses

Media representations of gender and place

Gendered landscapes of political power and activism

Indigenous perspectives on gender and land

Unit IV: Globalization, Development, and Gender

Concept of Gender Audit, Role of Gender Budget in bridging Gender Gap;

Empowerment of women (through education, economic opportunities, access to reproductive health services, involvement in decision making processes in various sectors)

Gendered impacts of globalization and neoliberalism on landscapes and livelihoods

Gender, development, and national policies

Suggested Books:

Women and Geography Study Group. (1984). *Geography and gender: an introduction to feminist geography*. London: Hutchinson Education

Gillian, Rose. (1993). *Feminism and Geography: the limits of geographical knowledge*. Minnesota: University of Minnesota Press

McDowell, Linda. (1999). *Gender, identity and place: Understanding feminist geographies*. Minnesota: University of Minnesota Press

McDowell, Linda. (1992). "Doing gender: feminism, feminists and research methods in human geography." *Transactions of the institute of British Geographers*: 399-416.

Raju, Saraswati. (2011). *Gendered Geographies: Space and Place in the South Asia*, (ed.).

New Delhi: Oxford University Press.

Raju, Saraswati, and Kuntala Lahiri-Dutt. (2011). *Doing gender, doing geography: emerging research in India*, (ed.). London: Routledge

Agarwal, Bina. (1994). *Afield of one's own: Gender and land rights in South Asia*. Vol. 58. Cambridge: Cambridge University Press

Ghadially, Rehana, (2007). *Urban women in contemporary India: a reader*,(ed.) .New Delhi: Sage Publications.

Mies, Maria. (1998). *Patriarchy and accumulation on a world scale: Women in the international division of labour*. New York: Palgrave Macmillan.

Nongbri, Tiplut. (2003). *Development, ethnicity and gender: select essays on tribes in India*. Jaipur: Rawat Publications

James K. S. (2010) : Population , Gender and Health in India, Academic Foundation Radiant Book

Sharma, K. L. (ed) (2001), "Social Inequality In India", Berkeley, University of California Press.

Paper Title: Tribal geography

Paper Code: GEOSPL25094

Credit: 4

Marks: 100

Course Objectives:

- Examine the socio-cultural, ecological, and economic aspects of tribal communities in India, focusing on their characteristics, traditional knowledge, mobility, and challenges.
- Analyze the spatial distribution, typology, and constitutional safeguards for tribal populations, alongside policies aimed at addressing their issues.

Course Outcomes:

- Define Scheduled Tribe (ST) and distinguish between tribe and Scheduled Tribe based on legal definitions and characteristics.
- Describe the spatial distribution of scheduled tribes in India with a focus on specific regions like the Bodoland Territorial Region (BTR).
- Evaluate traditional ecological knowledge among tribes, including practices related to irrigation, food preservation, traditional medicine, and handicrafts.
- Discuss the impact of displacement due to developmental projects, national parks, and forest dependence on tribal communities.
- Analyze social mobility among tribes, exploring processes such as tribalization, de-tribalization, and re-tribalization, alongside aspects of tribal marriage and religion.
- Identify and assess the challenges faced by tribal populations, including geographical separation, cultural, social, economic, educational, and health-related problems.
- Evaluate constitutional safeguards like Tribal belts and blocks, the Sixth Schedule, and the Forest Rights Act aimed at addressing tribal issues and promoting their socio-economic development.

Unit I: Understanding tribals

Defining Scheduled Tribe; Understanding the difference between tribe and Scheduled Tribe; Characteristics of Tribe;

Spatial distribution of scheduled tribes in India, Bodoland Territorial Region

Typonomy

Unit II: Tribal ecology

Traditional knowledge: Irrigation system, food preservation, traditional medicine, alcohol preparation, handloom and textile; Sacred groves

Displacement of tribals from their habitat: dam construction, developmental activities, national park, Tribal dependence on forest

Unit III: Mobility of tribes

Meaning and types of social mobility; Social process: Tribalization, De-tribalization, Re-triballization; Tribal marriage, Tribal religion

Unit IV: Challenges of tribal population

Geographical separation; Cultural Problems; Social Problems; Economic Problems; Problems of Education; Problems of Health and Sanitation; Views to solve tribal problems; Constitutional safeguards to tribals: Tribal belts and blocks, Sixth schedule; Forest Rights Act

Suggested Readings:

Goswamy, Bhupendra Nath (2017). Political Ecology of Deforestation and Tribal Life. Concept Publishing Company Pvt. Ltd.

Husain, Majid (2018). Human Geography, 5th Edition. Rawat Publications.

Mukhopadhyay, Srimanta (2013). Human Geography of Tribal Region. Satyam Publishing House.

Rao, CN Shankar (2019). Indian Social Problems, A Sociological Perspective. S Chand and Company Limited.

Rao, CN Shankar (2019). Principles Of Sociology, With an Introduction to Social Thoughts. S Chand and Company Limited.

Sen, J. (2019). A Textbook of Social and Cultural Geography. Kalyani Publishers.

Shah, Mihir; Vijayshankar, PS & BRL Foundation (2022). Tribal Development Report: Human Development and Governance. Routledge India.

Paper Title: Practical-IV

Paper Code: GEOSPL25104

Credit: 4

Marks: 100

Course Objectives:

- Equip students with practical skills in using statistical software packages (SPSS, R, and Stata) for data management, analysis, and visualization.
- Develop students' ability to conduct fieldwork, collect data on health, gender, and tribal issues, and analyze it using appropriate software tools.

Course Outcomes:

- Navigate and utilize the SPSS environment proficiently for tasks such as creating data frames, reading different file formats, and transforming data through recoding and computing variables.

- Apply SPSS to generate and interpret univariate, bivariate, and multivariate tables to summarize and analyze data effectively.
- Demonstrate proficiency in the R environment, including data input/output, basic statistical calculations (frequency distribution, mean, standard deviation, median), and creating basic graphs.
- Utilize Stata for data transformation tasks such as recoding and computing variables, and generate comprehensive tables to analyze geographic data.
- Conduct fieldwork to collect primary data on health, gender, and tribal issues in a selected study area under faculty guidance.
- Analyze collected data using SPSS, R, or Stata to draw insights and conclusions regarding health, gender, and tribal issues.
- Prepare a concise group field report summarizing findings from the fieldwork, including data analysis results and recommendations, within specified page limits, emphasizing clarity and coherence.

Unit I: SPSS for Geographic data analysis

- Familiarization with SPSS environment
- Creation of data frame
- Reading Excel, CSV file
- Data transformation: Recoding variable, Computing variable
- Generating tables: Uni variate, Bi-variate and Multi-variate tables

Unit II: R & Stata for Geographic data analysis

- R Environment
- Data input, import and export
- Frequency distribution, mean, standard deviation, and median
- Basic graphs
- Stata Environment
- Data transformation: Recoding variable, Computing variable
- Generating tables: Uni variate, Bi-variate and Multi-variate tables

Unit III & IV: Field work

The students, in consultation with assigned faculty, are required to collect data from a selected study area. The issues pertaining to Health, Gender and Tribal issues needs to be covered. The collected data should be analyzed in one of the data analysis software packages taught in the semester.

Based on the collected data a group field reports covering the Health, Gender and Tribal issues needs to be prepared. A group report should be prepared within a page limit of 20, inclusive of everything.

Suggested Readings:

Acock, Alan C (2014). A Gentle Introduction to Stata, 4th Edition. A Stata Press Publication
StataCorp LP, College Station, Texas.

Daniels, Lisa and Minot, Nicholas (2019).An Introduction to Statistics and Data Analysis Using Stata®, From Research Design to Final Report.Sage Publications.

- Field, A. (2009). *Discovering Statistics using SPSS*, Third Edition. Sage Publications.
- Gregory, S. (1978). *Statistical Methods and the Geographer*. London: Longman.
- IBM. IBM SPSS Statistics 25 Core System User's Guide. IBM
- IBM. IBM SPSS Statistics 25 Brief Guide. IBM
- Johnston, R. J. (1973). *Multivariate Statistical Analysis in Geography*. London: Longman.
- King, L. J. (1969). *Statistical Methods in Geographical Studies*. London.
- King, J. P. C. and C. A. M. (1968). *Quantitative Geography*. London: John Wiley.
- Mahmood, A. (1977). *Statistical Methods in Geographical Studies*. Delhi: Concept Publications.
- McCullagh, H. R. and P. S. (1974). *Quantitative Techniques in Geography: An Introduction*. Oxford: Clarendon Press.
- Paul, S. K. (1998). *Statistics for Geoscientists*. New Delhi: Tata McGraw Hill.
- Robinson, G. M. (1998). *Methods and Techniques in Human Geography*. Chichester: John Wiley & Sons.
- Stockemer, Daniel (2019). *Quantitative Methods for the Social Sciences, A Practical Introduction with Examples in SPSS and Stata*. Springer.
- Yeats, M. (1974). *An Introduction to Quantitative Analysis in Human Geography*. New York: McGraw, Hill.
- Unwin, D. (1981). *Introductory Spatial Analysis*. London: Methuen.

Semester: II

Specialization: Population Geography (C)

Paper Title: Geography of North-East India

Paper Code: GEOADL15064

Credit: 4

Marks: 100

Course Objectives:

- Provide an in-depth understanding of the physical, demographic, and socio-economic characteristics of North-East India and Assam.
- Analyze the geographical and socio-economic dynamics of the Bodoland Territorial Region (BTR).

Course Outcomes:

- Understand the locational significance, physiographic divisions, and climate of North-East India.
- Analyze the drainage systems, vegetation, and soil types in North-East India.
- Study population growth, density, and composition in North-East India, including religious and ethnic aspects.
- Examine agricultural practices, industrial development, and transport in North-East India.
- Identify socio-economic disparities and biodiversity resources in North-East India.
- Comprehend the geographical features, climate, and significance of the Brahmaputra in Assam.
- Analyze the demographic and socio-economic dynamics of the Bodoland Territorial Region (BTR).

Unit I: North-East India

Locational significance of North East India

Physiographic divisions and climate of North East India

Drainage system, Vegetation and Soil types of North East India

Population growth, density, age-sex composition,

Composition: religious composition, ethnic composition

Unit II: Socio-Economic Traits of North-East India

Agricultural practices: Types of farming, major crops and distribution

Industrial development: Types of Industries, problems and prospects

Transport and communication,

Disparity in socio-economic development and problems

Resources and biodiversity

Unit III: Geography of Assam

Locational significance of Assam

Physiographic divisions and climate of Assam

Significance of Brahmaputra

Soil of Assam

Population growth and spatial distribution

Unit IV: Dynamics of BTR

Location and formation of BTR

Population growth, density, age-sex composition, caste composition, and religious composition

Literacy rate, Educational attainment level

Dependency ratio, work participation

Forest cover, National Park, Biodiversity

Suggested Readings:

Barad, Gomit K (2018). Geography of North East India. Pacific Books International.

Bhagabati, AK, Bora, AK & Kar, BK (2018). Geography of Assam. Rajesh Publications: New Delhi.

Bhakta, GP (1992). Geography of North-East India. Akashi Book Depot: Shillong.

Bhattacharyya, NN (2018). North East India, A Systematic Geography. Rajesh Publications: New Delhi.

Choudhury, RKD (2021). Demographic Scenario of the North East India. Concept Publishing Company Pvt. Ltd.

Devee, Geeta & Das, Puspanjalee (2018). North-East India: A Comprehensive Geography. EBH Publishers (India).

Saikia, Sailajananda; Nimasow, Gibji & Sora, Tage Rupa (2023). Unveiling the Mystique: Diversity in Geography of NE India. Notion Press.

Paper title: Advanced Remote Sensing and Geographic Information System

Course Code: GEOSPL15074

Total Credit: 4

Total Marks: 100

Course Objectives:

- Provide comprehensive knowledge of hyper-spectral and microwave remote sensing techniques, including their applications and limitations.
- Equip students with skills in digital image processing and the use of programming languages and AI in remote sensing and GIS.

Course Outcomes:

- Understand the principles of hyper-spectral remote sensing and thermal imaging.
- Learn about various hyper-spectral imaging sensors and their applications.
- Comprehend the basics of microwave remote sensing, including radar imaging and its properties.
- Differentiate between passive and active microwave remote sensing systems.
- Gain proficiency in digital image processing techniques, including pre-processing and image enhancement.
- Understand the role of programming languages and AI in remote sensing and GIS.
- Explore the use of cloud computing and automation in various applications of remote sensing, such as agriculture and hydrology.

Unit I: Introduction to Hyper-spectral Imaging

What is Hyper-spectral Remote Sensing, Airborne Visible Infrared Imaging Spectrometer, Compact Airborne Spectrographic Imager-2, Compact High resolution Imaging Spectrographic Imager-2

Thermal Remote sensing; Radiant versus Kinetic Temperature, Black body radiation, Thermal Imaging, properties and mapping, Thermal remote sensing sensors

Advantages and limitations of Hyper-spectral Remote Sensing remote sensing

Unit II: Introduction to Microwave Remote Sensing

Passive and Active Microwave Remote Sensing

Radar Imaging; Frequency/Wavelength, Polarization, Viewing Geometry, Spatial resolution of Radar system, Speckle, Surface geometry and roughness, Dielectric properties.

Airborne versus space-borne Radars, Radar Systems

Advantages and disadvantage of Radar Remote sensing

Unit III: Digital Image processing

Categorization of Image Processing

Image Processing System

Digital Image and its formats

Header Information and display of digital Image

Pre-Processing: Radiometric, Geometric and other

Image enhancement, Transformation, and transformation

Unit IV: Programming language and AI in Remote Sensing and GIS

Introduction to Programming languages and computer system

Introduction to Artificial Intelligence and Machine Learning in RS and GIS

Google Earth engine, and Cloud computing

Automation in image processing: Earth science, Agriculture, Forestry, Hydrology and flood

Suggested Books:

Bhatta B., 2018: Remote Sensing and GIS, Oxford

Burrough, P.A. and McDonnell, R.A., 1998: *Principles of Geographical Information Systems*, Oxford University Press.

Campbell J. B., 2007: *Introduction to Remote Sensing*, Guildford Press.

Chauniyal, D.D. (2010): *Sudur Samvedanevam Bhogolik Suchana Pranali*, ShardaPustakBhawan, Allahabad.

Jensen J. R., 2004: *Introductory Digital Image Processing: A Remote Sensing Perspective*, Prentice Hall.

Joseph, G. 2005: *Fundamentals of Remote Sensing*, United Press India.

Lillesand T. M., Kiefer R. W. and Chipman J. W., 2004: *Remote Sensing and Image Interpretation*, Wiley. (Wiley Student Edition).

Nag P. and Kudra, M., 1998: *Digital Remote Sensing*, Concept, New Delhi.

Rees W. G., 2001: *Physical Principles of Remote Sensing*, Cambridge University Press.

Sarkar, A. (2015): *Practical Geography: A Systematic Approach*. Orient Black Swan PrivateLtd., New Delhi.

Singh R. B. and Murai S., 1998: *Space-informatics for Sustainable Development*, Oxford and IBH Pub.

Wolf P. R. and Dewitt B. A., 2000: *Elements of Photogrammetry: With Applications in GIS*, McGraw-Hill.

Paper Title: Fertility Studies

Paper code: GEOSPL15084

Credit: 4

Marks: 100

Course Objectives:

- Provide a comprehensive understanding of fertility concepts, theories, and measures, emphasizing their significance in population dynamics and demographic studies.
- Analyze global and regional trends in fertility, factors influencing fertility levels, and theoretical frameworks explaining fertility behavior.

Course Outcomes:

- Define and differentiate concepts such as fertility, fecundity, natural fertility, sterility, and contraception, and discuss their biological and social implications.
- Explain the importance of studying fertility in understanding population dynamics, including demographic transitions and population aging.
- Identify sources of fertility data and evaluate their reliability and applicability in demographic research.
- Analyze and compare fertility levels, trends, and differentials between developed and developing countries, highlighting factors contributing to these variations.
- Discuss the phenomenon of below-replacement level fertility in developed countries and its implications for population growth and aging.
- Evaluate the causes of high fertility in developing countries, considering socio-economic, cultural, and demographic factors.
- Describe and discuss various theories of fertility proposed by scholars such as Kinsley Davis, Judith Blake, John Bongaarts, Becker, Easterlin, and Caldwell, analyzing their frameworks and implications for fertility behavior.

Unit I: Concepts

Concept of Fertility, Fecundity, Natural fertility, Sterility, Contraception

Fertility: Biological limits and Social Norms, Theoretical maximum

Importance of the study fertility in population dynamics

Sources of fertility data

Unit II: World Fertility Transition

Levels, Trends and Differentials in fertility of Developed and Developing Countries

Factors affecting fertility

Below-replacement level fertility in developed countries and its implications

Causes of high fertility in developing countries

Spatio-temporal variation in fertility in India: findings from NFHSs

Unit III: Theories of Fertility

Kingsley Davis and Judith Blake, and John Bongaart's determinants of fertility
Theory of Change and Response, Liebenstein's Theory, Becker's Theory, Easterlin's Framework of Fertility, Caldwell's Wealth Flow Theory

Unit IV: Measures of Fertility

Basic measures of fertility: Crude birth rate, General fertility rate, General marital fertility rate, Age specific fertility rate, Age specific marital fertility rate, Total fertility rate, Total marital fertility rate

Standardization of crude birth rate, Sex age adjusted birth rate

Measures of Reproduction: Gross reproduction rate, Net reproduction rate

Suggested Readings:

- Bhende, A. A., & Kanitkar, T. (1978). *Principles of Population Studies*. Himalaya Publishing House.
- Caldwell, J. C. (1990). What do we know about health transition: The cultural, social and behavioural determinants of health. In *The Proceedings of an International Workshop, Vol. 1 & 2*. Health Transition Centre, Australian National University.
- Coontz, S. H. (1957). *Population Theories and their Economic Interpretation*. Routledge.
- Kaa, D. J. van de. (1996). Anchored Narratives: The Story and Findings of Half a Century of Research into the Determinants of Fertility. *Population Studies*, 50(3), 389–432. <https://doi.org/10.1080/0032472031000149546>
- Mandelbaum, D. G. (1974). *Human Fertility in India: Social Components and Policy Perspectives*. University of California Press.
- Mason, A. (Ed.). (2002). *Population Change and Economic Development in East Asia: Challenges Met, Opportunities Seized*. Stanford University Press.
- Mishra, B. D. (1981). *An Introduction to the Study of Population*. South Asian Publishers, Pvt. Ltd.
- Mosley, W. H., & Chen, L. C. (1984). Analytical Framework for the Study of Child Survival in Developing Countries. *Population and Development Review*, 10, 25–45.
- Omran, A. R. (2005). The epidemiologic transition: a theory of the epidemiology of population change. 1971. *The Milbank Quarterly*, 83(4), 731–757. <https://doi.org/10.1111/j.1468-0009.2005.00398.x>
- Park, K. (2021). *Text Book of Preventive and Social Medicine* (26th ed.). Banarsidas Bhanot Publishers.
- Preston, S. ., Heuveline, P., & Guillot, M. (2000). *Demography: Measuring and Modeling Population Processes*. Wiley-Blackwell.
- Ram, F., & Pathak, K. B. (1998). *Techniques of Demographic Analysis*. Himalaya Publishing House.
- Siegel, J. S., & Swanson, D. A. (2004). *The Methods and Materials of Demography* (2nd ed., pp. 371–405, 407–428, 429–453). Elsevier Academic Press.
- Spira, A., Leridon, H., & Gray, R. (Eds.). (1993). *Bomedical and Determinants of Reproduction*. Clarendon Press.
- Srinivasan, K. (1998). *Basic Demographic Techniques and Applications* (pp. 59–85). Sage Publications.
- United Nations. (1973). *Determinants and Consequences of Population Trends, Vol. 1* (pp. 96–104). UN.

United Nations. (1999). Below Replacement Fertility. In *Population Bulletin of the UN, Special Issue Nos. 40/41*. Department of Economic and Social Affairs, UN.

World Health Organization. (2015). International statistical classification of diseases and related health problems, 10th revision, Fifth edition. *World Health Organization*.

Paper Title: Mortality Studies

Paper code: GEOSPL15094

Credit: 4

Marks: 100

Course Objectives:

- Explore fundamental concepts and measures related to mortality, including death, infant mortality, child mortality, and maternal mortality, along with life table construction and data sources.
- Analyze mortality trends, differentials, and causes in global and regional contexts, focusing on India and Northeast India.

Course Outcomes:

- Define and differentiate concepts such as death, abortion, still births, live births, infant mortality, early and late neonatal death, and maternal mortality.
- Explain the significance of mortality measures like crude death rate, infant mortality rate, maternal mortality ratio, and life expectancy at birth in demographic analysis.
- Identify sources of mortality data and evaluate their reliability for demographic research and policy formulation.
- Analyze historical and contemporary trends in mortality levels and causes in developed and developing regions, emphasizing factors responsible for high mortality in the past in developing countries.
- Discuss causes of infant mortality, distinguishing between endogenous and exogenous factors, and evaluate trends and leading causes of death in India.
- Calculate and interpret mortality measures such as age-specific death rates, infant mortality rates, and construct abridged life tables to understand population health dynamics.
- Evaluate spatio-temporal variations in death rates and infant mortality rates in Northeast India, analyzing rural-urban and age-sex differentials and their implications for public health interventions.

Unit I: Concepts

Concept of death, abortion, fetal deaths, still births, live birth, deaths

Concept of Infant Mortality, early and late neonatal death

Concept of Child Mortality, Maternal Mortality

Life table: Concept, types, assumptions, life expectancy at birth

Sources of mortality data

Unit II: Mortality Transition

Levels and trends in mortality in developed and developing regions;

Factors responsible for high mortality in the past in developing countries

Causes of infant mortality (endogenous and exogenous)
Levels and trends of infant and child mortality in India;
Leading causes of death in India

Unit III: Measures of mortality

Crude death rate, Age specific death rate, Age sex specific death rate
Infant mortality rate, Standardization of crude death rate
Maternal mortality ratio,
Life table: Construction of abridged life table
Mosley Chen Framework

Unit IV: Mortality in India

Spatio temporal variation in death rate in Northeast India
Rural-Urban and Age- Sex differentials in death rate in Northeast India
Spatio temporal variation in Infant Mortality Rate in Northeast India
Rural-Urban differentials in Infant Mortality Rate in Northeast India
Causes of deaths in India
Accessibility; Physiography and IMR

Suggested Readings:

- Bhende, A. A., & Kanitkar, T. (1978). *Principles of Population Studies*. Himalaya Publishing House.
- Caldwell, J. C. (1990). What do we know about health transition: The cultural, social and behavioural determinants of health. In *The Proceedings of an International Workshop, Vol. 1 & 2*. Health Transition Centre, Australian National University.
- Canning, D., Bloom, D. E., & Sevilla, J. (2003). *The Demographic Dividend: A New Perspective on the Economic Consequences of Population Change*. RAND.
- Coontz, S. H. (1957). *Population Theories and their Economic Interpretation*. Routledge.
- Mason, A. (Ed.). (2002). *Population Change and Economic Development in East Asia: Challenges Met, Opportunities Seized*. Stanford University Press.
- Mishra, B. D. (1981). *An Introduction to the Study of Population*. South Asian Publishers, Pvt. Ltd.
- Mosley, W. H., & Chen, L. C. (1984). Analytical Framework for the Study of Child Survival in Developing Countries. *Population and Development Review*, 10, 25–45.
- Murray, C. J. (1994). Quantifying the burden of disease: the technical basis for disability-adjusted life years. *Bulletin of the World Health Organization*, 72(3), 429–445. <http://www.ncbi.nlm.nih.gov/pubmed/8062401>
- Omran, A. R. (2005). The epidemiologic transition: a theory of the epidemiology of population change. 1971. *The Milbank Quarterly*, 83(4), 731–757. <https://doi.org/10.1111/j.1468-0009.2005.00398.x>
- Park, K. (2021). *Text Book of Preventive and Social Medicine* (26th ed.). Banarsidas Bhanot Publishers.
- Pool, I., Wong, L. R., & Vilquin, E. (Eds.). (2006). *Age-Structural Transitions: Challenges for Development*. CIRCRED.
- Preston, S., Heuveline, P., & Guillot, M. (2000). *Demography: Measuring and Modeling Population Processes*. Wiley-Blackwell.
- Ram, F., & Pathak, K. B. (1998). *Techniques of Demographic Analysis*. Himalaya Publishing

- House.
- Siegel, J. S., & Swanson, D. A. (2004). *The Methods and Materials of Demography* (2nd ed., pp. 371–405, 407–428, 429–453). Elsevier Academic Press.
- Spira, A., Leridon, H., & Gray, R. (Eds.). (1993). *Bomedical and Determinants of Reproduction*. Clarendon Press.
- Srinivasan, K. (1998). *Basic Demographic Techniques and Applications* (pp. 59–85). Sage Publications.
- United Nations. (1973). *Determinants and Consequences of Population Trends, Vol. 1* (pp. 96–104). UN.
- United Nations. (1999). Below Replacement Fertility. In *Population Bulletin of the UN, Special Issue Nos. 40/41*. Department of Economic and Social Affairs, UN.
- World Health Organization. (2015). International statistical classification of diseases and related health problems, 10th revision, Fifth edition. *World Health Organization*.

Paper Title: Practical-II

Paper code: GEOSPL15104

Credit: 4

Marks: 100

Course Objectives:

- Provide practical skills in radar remote sensing and multispectral image analysis for environmental and geospatial applications.
- Develop proficiency in using tools like SNEP, Google Earth Engine, and QGIS for radar image preprocessing, water body mapping, land cover classification, and fertility and mortality analysis frameworks.

Course Outcomes:

- Apply SNEP and radar image preprocessing techniques for water body mapping, flood inundation mapping, soil mapping, and vegetation mapping.
- Utilize Google Earth Engine and QGIS for multispectral image analysis including land cover classification, urban sprawl mapping, and heat and thermal mapping.
- Calculate and interpret fertility indicators such as crude birth rate (CBR), general fertility rate (GFR), age-specific fertility rate (ASFR), and total fertility rate (TFR).
- Standardize crude birth rate (CBR) and calculate sex age adjusted birth rate (SAABR) and gross reproduction rate (GRR) to analyze fertility dynamics.
- Compute mortality indicators such as crude death rate (CDR), age-specific death rate (ASDR), infant mortality rate (IMR), and construct life tables for mortality analysis.
- Apply direct and indirect techniques for standardizing crude death rate (CDR) to compare mortality rates across different populations.
- Interpret and analyze environmental and demographic data using geospatial tools to address real-world challenges related to fertility, mortality, and environmental mapping.

Unit I: Application of Radar Remote Sensing

- Familiarizing SNEP tool
- RADAR image preprocessing
- Water body mapping
- Flood inundation mapping

- Soil mapping
- Vegetation mapping

Unit II: Application of Multispectral image

- Familiarizing Google Earth Engine/QGIS
- Land Cover classification
- Urban sprawl mapping
- Heat and thermal mapping
- NDVI and NDWI

Unit III: Framework for Fertility

- CBR, GFR, ASFR, TFR
- Standardization of CBR
- Sex Age Adjusted Birth Rate (SAABR)
- Gross Reproduction Rate (GRR)

Unit IV: Framework for Mortality Analysis

- Crude Death Rate, Age Specific Death Rate (ASDR)
- Direct and indirect techniques of standardization of CDR
- Infant Mortality Rate
- Construction of Life Table

Suggested Readings:

- Bhende, A. A., & Kanitkar, T. (1978). *Principles of Population Studies*. Himalaya Publishing House.
- Caldwell, J. C. (1990). What do we know about health transition: The cultural, social and behavioural determinants of health. In *The Proceedings of an International Workshop, Vol. 1 & 2*. Health Transition Centre, Australian National University.
- Mishra, B. D. (1981). *An Introduction to the Study of Population*. South Asian Publishers, Pvt. Ltd.
- Park, K. (2021). *Text Book of Preventive and Social Medicine* (26th ed.). Banarsidas Bhanot Publishers.
- Ram, F., & Pathak, K. B. (1998). *Techniques of Demographic Analysis*. Himalaya Publishing House.
- Robinson, G. M. (1998). *Methods and Techniques in Human Geography*. Chichester: John Wiley & Sons.
- Siegel, J. S., & Swanson, D. A. (2004). *The Methods and Materials of Demography* (2nd ed., pp. 371–405, 407–428, 429–453). Elsevier Academic Press.
- Srinivasan, K. (1998). *Basic Demographic Techniques and Applications* (pp. 59–85). Sage Publications.
- United Nations. (1973). *Determinants and Consequences of Population Trends, Vol. 1* (pp. 96–104). UN.
- Yeats, M. (1974). *An Introduction to Quantitative Analysis in Human Geography*. New York: McGraw, Hill.

III Semester

Population Geography Specialization (C)

Paper title: Settlement Geography

Course code: GEOSPL25014

Credits: 4

Marks: 100

Course Objectives:

- Provide a comprehensive understanding of settlement geography, focusing on the types, patterns, and theories related to human settlements.
- Analyze the processes, classifications, and challenges of urbanization and urban development in both Indian and global contexts.

Course Outcomes:

- Define and explain the scope of settlement geography, including the origin, growth, types, patterns, and house types of settlements.
- Examine rural-urban relationships, understanding the dichotomy and continuum between rural and urban areas.
- Classify settlements based on functional characteristics, cultural aspects, stages of growth and decay, and according to Indian census classifications.
- Understand prominent theories and models in settlement geography, such as the Rank Size Rule, Primate City Model, and Central Place Theory.
- Analyze urbanization processes, urbanism, and the factors contributing to urban sprawl and urban agglomeration.
- Evaluate issues related to slums and squatter settlements, including their causes, development factors, and associated socio-economic problems.
- Assess urbanization trends and challenges in India and globally, including the impact on physical and social environments and the role of urban planning in sustainable development.

Unit I: Fundamentals of Settlement Geography

Definition and scope of settlement geography

Origin and growth of settlements

Settlement types, Pattern and house types

Concept of site and situation in settlement geography

Tribal settlements of Western, Central and North East India

Unit II: Classification of settlements:

Rural- urban relationship: dichotomy and continuum

Classification of settlement based on Rural(functional), Urban (Culture, stages of growth and Decay, functional classification of urban centers and Indian Cities-Ashok Mitra, Mukherjee and others, Census 1991).

Unit III: Theory and models in Settlement Geography

Rank Size Rule, Primate City Model, Central Place Theory

Concentric zone model, Sectorial Model, Multiple Nuclei Model

Unit IV: Urbanization, Urbanism and the City

Process of Urbanization and Urbanism

Urban sprawl, Urban fringe, and Urban Agglomeration

Slums and squatter: Cause and factors of its development and associated problems

Urbanization, Urbanism, Urban planning and its challenges; Physical and social Environment

Urbanization in India/World

Suggested Readings:

Bhende, A. A., & Kanitkar, T. (2019). *Principles of Population Studies*. Himalaya Publishing House.

Chandna, R. C. (2015). *Geography of Population*. Kalyani Publishers.

Hassan, M.I. (2007). *Population Geography*. Rawat Publications.

Hussain, J. (2021). *Settlement Geography*. Notion Press.

Husain, M. (2016). *Moddels in Geography*. Rawat Publications.

Husain, M. (2021). *Human Geography*. Sixth Edition. Rawat Publications.

Ghosh, S. (2015). *Introduction to Settlement Geography*. Orient Blackswan

Khullar, D.R. (2018). *India, A comprehensive Geography*. Kalyani Publishers.

Lundquist, J.H., Anderton, D.L., & Yaukey, D. (2015). *Demography, The Study of Human Population*. Fourth Edition. Waveland Press, Inc.

Newbold, K.B. (2017). *Population Geography: Tools & Issues*. Rawat Publications.

Ram, F. & Pathak, K. B. (1998). *Techniques of Demographic Analysis*. Himalaya Publishing House.

Singh, R.Y. (2002). *Geography of Settlements*. Rawat Publications.

Tiwari, R.C. (2020). *Settlement Geography, Rural and Urban Settlements*. Pravalika publication.

Paper Title: Migration Studies

Paper Code: GEOSPL25024

Credit: 4

Marks: 100

Course Objectives:

- Explore the concepts, types, determinants, consequences, and theories of migration, both internal and international.
- Familiarize students with methods and measures used to analyze migration patterns and trends, using both direct and indirect estimation techniques.

Course Outcomes:

- Define migration, mobility, seasonal migration, and daily movement, and classify internal migration types such as rural to rural, rural to urban, urban to urban, and urban to rural, along with intra-district, inter-district, and inter-state migration.
- Analyze the determinants and consequences of migration, including differential migration patterns and specific migration trends observed in India and Northeast India.
- Identify sources of international migration data and discuss various patterns including historical trends, labor migration, brain drain, refugee migration, and illegal migration.
- Evaluate the causes and consequences of international migration, considering economic, social, and political factors.
- Examine migration theories and models proposed by Ravenstein, Everett Lee, Reilly, Zipf, Staufer, Gravity, Hagerstrand, Wolpert, Lewis-Fei-Ranis, and Todaro, and discuss their relevance in explaining migration patterns.

- Calculate direct estimation of lifetime and inter-censal migration rates using census data, and apply indirect measures such as the Vital Statistics Method, National Growth Rate Method, Census Survival Ratio method, and Life Table Survival Ratio method to analyze net internal migration.
- Interpret and analyze migration data to understand population dynamics, urbanization trends, regional disparities, and policy implications related to migration patterns and trends.

Unit I: Internal Migration

Concept of migration, mobility, seasonal migration, daily movement

Internal Migration types: Rural to Rural, Rural to Urban, Urban to Urban, and Urban to Rural;

Intra District, Inter District and Inter State migration

Determinants and consequences of migration

Differential migration, Migration patterns in India

Migration Patterns in Northeast India

Unit II: Sources of international migration data and problems

Sources of International Migration data

Patterns of international migration: Historical and recent trends, permanent immigrants, Indian Diaspora and people of Indian origin, labour migration, brain drain, refugee migration and Illegal migration

Causes and consequences of international migration

Unit III: Migration theories and models

Ravenstein's Laws of Migration

Everett Lee's Theory of Migration

Theories of Migration-Reilly, Zipf, Staufer, Gravity, Hagerstrand and Wolpert

Lewis-Fei-Ranis Model of Development

Todaro's Model of Rural-Urban Migration

Unit IV: Measures of Migration

Direct estimation of lifetime and inter-censal migration rates from census data

Indirect measures of net internal migration: Vital Statistics Method, National Growth Rate Method, Census Survival Ratio method, and Life Table Survival Ratio method

Suggested Readings:

Arriaga, E. E. (1975). *Selected Measures of Urbanization*. U.S. Bureau of the Census.

Cohen, R. (Ed.). (1996). *Theories of Migration*. Edward Elgar Publishing Ltd.

Goldstein, S., Sly, D., & Arriaga, E. E. (1975). *The Measurement of Urbanization and Projection of Urban Population*. Ordina Editions.

Jones, G. W., & Visaria, P. (Eds.). (1997). *Urbanization in Large Developing Countries: China, Indonesia, Brazil and India*. Clarendon Press.

Oberai, A. S. (1987). *Migration, Urbanization and Development*. International Labour Office.

Swanson, D. A., & Siegel, J. S. (Eds.). (2004). *The Methods and Materials of Demography*. Academic Press Inc.

Todaro, M. P. (1976). *International Migration in Developing Countries: A Review of Theory, Evidence, Methodology and Research Priorities*. International Labour Office.

United Nations. (1979). *Trends and Characteristics of International Migration Since 1950*. Department of Economic and Social Affairs, UN.

United Nations. (1983). *Determinants and Consequences of Population Trends, Vol 1*. Department of Economic and Social Affairs, UN.

Paper title: Forced Migration Studies

Paper Code: GEOSPL25034

Credit: 4

Marks: 100

Course Objectives:

- Explore the concepts, types, and distinctions of forced migration, including internal displacement, refugees, stateless populations, asylum seekers, and illegal immigrants.
- Analyze international conventions, protocols, policies, and frameworks related to forced migration and displacement, focusing on legal protections and rehabilitation measures.

Course Outcomes:

- Differentiate between migration and forced migration, and categorize types of forced migration such as conflict-induced, development-induced, disaster-induced, and economic-induced displacement.
- Define and discuss internally displaced persons (IDPs), stateless populations, refugees, asylum seekers, and illegal immigrants, understanding their legal statuses and rights under international law.
- Evaluate the causes and consequences of internal displacement, including social, economic, and demographic impacts on individuals and communities.
- Examine the Refugee Convention of 1951, the Protocol relating to the Status of Refugees of 1967, and the Guiding Principles on Internal Displacement, analyzing their significance in protecting displaced populations.
- Discuss national policies and frameworks for rehabilitation and resettlement of displaced persons, with a focus on initiatives outlined in the National Rehabilitation and Resettlement Policy and early five-year plans.
- Analyze models and frameworks for refugee integration, durable solutions for IDPs, and spatial models of internal displacement, exploring socio-economic, cultural, and spatial dimensions.
- Assess criteria and conditions determining the end of displacement, including cause-based, solution-based, and need-based approaches, and discuss challenges and strategies for achieving durable solutions for displaced populations.

Unit I: Conceptual background

Concept of forced migration, understanding difference between migration and forced migration, types of forced migration

Understanding differences among the concepts of internally displaced persons, stateless population, refugees, asylum seekers, illegal immigrants

Unit II: Internal displacement of population

Internal displacement of population: Causes, social, economic & demographic consequences

Development Induced Displacement
Conflict Induced Displacement
Disaster Induced Displacement
Economic Induced Displacement

Unit III: Convention and Protocols

Refugee Convention 1951
Protocol relating to the status of refugees 1967
Guiding principles on internal displacement
National Rehabilitation and Resettlement Policy and,
Policies relating to Rehabilitation of Displaced Persons in first five years plan

Unit IV: Models and frameworks

Refugee integration model: Socio-economic integration and Cultural integration,
Framework for Durable Solutions for Internally Displaced Persons,
Spatial model of internal displacement and forced migration,
Impoverishment Risks and Reconstruction Model
Durable solution for IDPs: When does the displacement status end?, Process, Conditions
Criteria for Determining the End of Displacement – Caused based, Solution based and Need based

Suggested Readings

- Benjamin, J.A., 1998. The Gender Dimensions of Internal Displacement: Concept Paper and Annotated Bibliography, Office of Emergency Programmes Working Paper Series. UNICEF, New York
- Brookings, 2010. IASC Framework on Durable Solutions for Internally Displaced Persons. The Brookings Institution – University of Bern Project on Internal Displacement
- Calcutta Research Group, 2006. Voices of the internally displaced in south Asia. <http://www.mcrg.ac.in/Voices.pdf>
- Cernea, M. M., 2002. Impoverishment Risks, Risk Management, and Reconstruction: A Model of Population Displacement and Resettlement.
- Cernea, M. M., 2007. Risk Analysis and the Risks and Reconstruction Model in Population Resettlement: Training Course. Asian Development Bank.
- Das, S.K. (ed), 2008. Blisters on their Feet, Tales of Internally Displaced Persons in India's North East. Sage India.
- Echevarria, J. and Gardeazabal, J., 2018. A spatial model of internal displacement and forced migration. https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=SAEe2018&paper_id=427
- GoI. 1st Five Year Plan, Chapter 38. Planning Commission, Government of India. <http://planningcommission.nic.in/plans/planrel/fiveyr/1st/1planch38.html>
- IDMC, 2023. Global Report on Internal Displacement 2023. Internal Displacement Monitoring Centre
- Rajput, S. G., 2013. Internal Displacement: Simplifying a Complex Social Phenomenon. <https://www.beyondintractability.org/rajput-internal-displacement>
- Refugee Studies Centre, 2003. When does internal displacement end? Forced Migration Review, 17.

- The Brookings Institution, 2007. When Displacement Ends, A Framework for Durable Solutions. THE Brookings Institution – University of Bern Project on Internal Displacement. https://www.brookings.edu/wp-content/uploads/2016/07/2007_durablesolutions_full.pdf
- United Nations, 2001. Guiding principles on internal displacement. <https://www.unhcr.org/protection/idps/43ce1cff2/guiding-principles-internal-displacement.html>
- UNHCR, 2022. Global trends, Forced displacement in 2022. United Nations High Commissioner for Refugees.
- WHOSEAR, 2018. Health of refugees and migrants, Regional situation analysis, practices, experiences, lessons learned and ways forward. World Health Organisation South East Asia Region. <https://www.who.int/migrants/publications/SEARO-report.pdf?ua=1>
- World Bank Group, 2017. Forcibly Displaced, Toward a Development Approach Supporting Refugees, the Internally Displaced, and Their Hosts.

Paper Title: Population and Resource Interface

Paper Code: GEOSPL25044

Credit: 4

Marks: 100

Course Objectives:

- Explore the complex interrelations between population dynamics and development across various dimensions including demographic transitions, resource management, environmental impacts, and policy interventions.
- Analyze diverse perspectives on population and development, from pessimist to optimist viewpoints, and their implications for policy and practice.

Course Outcomes:

- Explain the effects of development on demographic variables such as demographic transition, age structure, fertility, and mortality rates.
- Compare and contrast pessimist, optimist, and neutralist views regarding the relationship between population growth and development outcomes.
- Evaluate modern theories of population and development, including Malthusianism, Marxian perspectives, and the Tragedy of the Commons theory.
- Describe the concept of natural, capital, and human resources and their quantitative and qualitative aspects in relation to population dynamics.
- Assess the implications of population growth on essential sectors such as food security, sanitation, housing, employment, education, and health.
- Analyze the ecological and environmental dimensions of sustainable development and various approaches to environmental management.
- Discuss different population policies worldwide, including pro-natalist and anti-natalist strategies, and evaluate their impacts on fertility, mortality, migration, and special groups such as women, children, youth, and the aged.

Unit I: Linkages of Population on Development

Effect of development on demographic variables: Demographic transition, age structure transition, Declines of fertility and mortality.

Divergent views regarding the relationship between population and development: pessimist, optimist, and neutralist.

Modern theories of population and development: Malthus, Marx, Ricardo theory and their implications, Tragedy of Commons, Limit to growth Study

Unit II: Population and Resources

Concept of Natural resources, Capital Resources and Human Resources

Quantitative aspects of Human Resource: concepts of labour force, economically active population, unemployment and types of unemployment: disguised, seasonal frictional and chronic.

Qualitative aspects of Human Resource: factors influencing productivity of human beings

Implications of population growth on food, sanitation, housing, employment, education, and health

Unit III: Population and Environment

Ecological and environmental dimensions of sustainable development;

Approaches to environment: Gandhian approach, Marxian/Socialist approach;

Linkage between Population growth and climate change;

Pressure of population growth on water resources, land use, soil erosion, desertification;

Environmental degradation and its implications for health

Unit IV: Population Policies

Definition of Population Policy; Principal features of a population policy;

Population Policies of Pro-natalist and Anti-Natalist Countries

Fertility, Mortality, and Migration influencing policies

Policies and programmes for special groups: women and children, youth and aged;

National Population Policy 2000, National Health Policy 2002, and National Health Mission 2013

Suggested Readings:

Agarwala, S. N. (1986). *India's Population Problems* (3rd ed.). McGraw-Hill Education.

Ahmad, A., Noin, D., & Sharma, H. N. (Eds.). (1997). *Demographic Transition: The Third World Scenario*. Rawat Publications.

Beaujeu-Garnier, J., & Beaver, S. H. (1966). *The Geography of Population*. Longman.

Bhende, A. A., & Kanitkar, T. (1978). *Principles of Population Studies*. Himalaya Publishing House.

Birdsall, N., Kelley, A. C., & Sinding, S. (Eds.). (2003). *Population Matters: Demographic Change, Economic Growth and Poverty in the Developing World*. Oxford University Press.

Bloom, D. E., Sevilla, J., & Canning, D. (2003). *The Demographic Dividend: New Perspective on Economic Consequences Population Change*. RAND Corporation.

Chandna, R. C. (2015). *A Geography of Population*. Kalyani Publishers.

Chee, S., House, W. J., & Lewis, L. (1999). Population policies and programmes in the post-ICPD era: can the Pacific Island countries meet the challenge? *Asia-Pacific Population Journal*, 14(1), 3–20. <http://www.ncbi.nlm.nih.gov/pubmed/12295289>

Chenery, H., & Srinivasan, T. N. (Eds.). (1988). *Handbook of Development Economics Vol. 1*. North-Holland.

- Clarke, J. I. (1971). *Population Geography and Developing Countries*. Pergamon Press.
- Clarke, J. I. (2013). *Population Geography* (W. B. Fisher (Ed.); 2nd ed.). Pergamon Press.
- Demko, G. J., Rose, H. M., & Schnell, G. A. (Eds.). (1970). *Population Geography: A Reader*. McGraw Hill.
- Gosal, G. S. (1984). Population Geography in India. In J. I. Clarke (Ed.), *Geography and Population: Approaches and Applications*. Pergamon Press.
- Haq, M. ul. (1996). *Reflections on Human Development*. Oxford University Press.
- Jamison, D. T., Breman, J. G., Measham, A. R., Alleyne, G., Claeson, M., Evans, D. B., Jha, P., Mills, A., & Musgrove, P. (Eds.). (2006). *Disease Control Priorities in Developing Countries* (2nd ed.). Oxford University Press.
- Kapila, R., & Kapila, U. (2001). *India's Economy in the Twenty First Century: Challenges and Opportunities*. Academic Foundation.
- Kawadia, G., & Ahuja, K. (2006). *Environmental Issues of Development*. Associated Publishers.
- Mehta, S. (1990). *Migration: A Spatial Perspective (A Case Study of Bist Doab-Punjab)*. Rawat Publications.
- National Research Council. (1986). *Population Growth and Economic Development: Policy Questions*. National Academic Press.
- Peabody, J. W., Rahman, M. O., Gertler, P. J., Mann, J., Farley, D. O., & Luck, J. (1999). *Policy and Health: Implication for Development in Asia*. Cambridge University Press.
- Peters, D. H., Yazbeck, A. S., Sharma, R. R., Ramana, G. N. V., Pritchett, L. H., & Wagstaff, A. (2002). *Better Health Care Systems for India's Poor: Findings, Analysis, and Options*. World Bank Publications.
- Pickin, C., & Leger, S. St. (1992). *Assessing Health Need Using Life Cycle Framework*. Open University Press.
- Ray, D. (1998). *Development Economics*. Princeton University Press.
- Raza, M., & Ahmad, A. (1990). *An Atlas of Tribal India*. Concept Publishing Company.
- Robinson, H. (1983). *Population and Resources*. Palgrave Macmillan.
- Sen, A. (2002). The Concept of Development. In C. Hollis & T. N. Srinivasan (Eds.), *Handbook of Development Economics Vol. 1*. Elsevier.
- Todaro, M. P. (1989). *Economic Development in the Third World*. Longman.
- Trewartha, G. T. (1969). *A Geography of Population: World Pattern*. John Wiley & Sons Inc.
- UNESCAP. (1988). *Asia Pacific Population Policies and Programmes: Future Directions*. UN.
- United Nations. (1973). *The Determinants and Consequences of Population Trends Vol. 1*.
- United Nations. (1974). World Population Plan of Action from the United Nations World Population Conference, Bucharest, August 19-30, 1974. *The Department of State Bulletin*, 1-14. <http://www.ncbi.nlm.nih.gov/pubmed/12229766>
- United Nations. (1998). *National Population Policies*. Department of Economic and Social Affairs, UN.
- United Nations Development Programme. (2006). *Human Development Report 2006*. UN. <https://doi.org/10.18356/334c604b-en>
- Woods, R. (1979). *Population Analysis in Geography*. Longman.
- Zelinsky, W. (1966). *A Prologue to Population Geography*. Prentice-Hall.

Paper Title: Practical - III

Paper Code: GEOSPL25054

Credit: 4

Marks: 100

Course Objectives:

- Provide comprehensive knowledge and skills in settlement geography, migration estimation, and population-resource interface analysis.
- Equip students with theoretical frameworks and practical methods to analyze settlement patterns, migration trends, and population-resource dynamics.

Course Outcomes:

- Demonstrate understanding of settlement geography concepts such as hierarchy, organization, pattern, nearest neighbor analysis, network analysis, and distance decay, applying them to analyze spatial arrangements and urban structures.
- Apply direct estimation methods to calculate lifetime and intercensal migration rates using place of birth, duration of residence, and place of last residence data, and classify migration by residence type and reasons.
- Utilize indirect estimation techniques including the National Growth Rate Method, Vital Statistics Method (Residual Method), Census Survival Ratio Method, and Life Table Survival Ratio Method to assess migration patterns and trends.
- Analyze the population-resource interface using indices such as Physical Quality of Life Index (PQLI), Human Development Index (HDI), Gender Development Index (GDI), dependency ratio, and labor classification to understand socio-economic development and resource utilization.
- Construct development indices like Disparity Index, Z-Score, and Principal Component Analysis (PCA) to measure regional disparities and socio-economic inequalities.
- Evaluate measures of aging within the context of population dynamics and demographic transitions, assessing implications for social policies and healthcare systems.
- Interpret and synthesize data from settlement geography, migration estimation, and population-resource interface analyses to propose evidence-based strategies for sustainable development and resource management.

Unit I: Settlement Geography

1. Hierarchy
2. Organization and pattern
3. Nearest Neighbor Analysis
4. Network analysis
5. Distance Decay

Unit II: Direct Estimation of Migration

1. Estimation of lifetime and intercensal migration from POB data
2. Estimation of Migration from Duration of Residence Data
3. Estimation of Migration from Place of Last Residence Data
4. Classification of migration by residence
5. Classification of migration by reasons

Unit III: Indirect Estimation of Migration

1. National Growth Rate Method
2. Vital Statistics Method (Residual Method)
3. Census Survival Ratio Method
4. Life Table Survival Ratio Method

Unit IV: Population-Resource Interface

1. Physical Quality of Life Index (PQLI), Human development index (HDI), Gender Development Index (GDI)
2. Dependency Ratio, Classification of labor
3. Disparity Index, Z-Score, PCA
4. Construction of Development Indices
5. Measures of Aging

Suggested Readings:

- Bhende, A. A., & Kanitkar, T. (1978). *Principles of Population Studies*. Himalaya Publishing House.
- Caldwell, J. C. (1990). What do we know about health transition: The cultural, social and behavioural determinants of health. In *The Proceedings of an International Workshop, Vol. 1 & 2*. Health Transition Centre, Australian National University.
- Mishra, B. D. (1981). *An Introduction to the Study of Population*. South Asian Publishers, Pvt. Ltd.
- Park, K. (2021). *Text Book of Preventive and Social Medicine* (26th ed.). Banarsidas Bhanot Publishers.
- Ram, F., & Pathak, K. B. (1998). *Techniques of Demographic Analysis*. Himalaya Publishing House.
- Robinson, G. M. (1998). *Methods and Techniques in Human Geography*. Chichester: John Wiley & Sons.
- Siegel, J. S., & Swanson, D. A. (2004). *The Methods and Materials of Demography* (2nd ed., pp. 371–405, 407–428, 429–453). Elsevier Academic Press.
- Srinivasan, K. (1998). *Basic Demographic Techniques and Applications* (pp. 59–85). Sage Publications.
- United Nations. (1973). *Determinants and Consequences of Population Trends, Vol. 1* (pp. 96–104). UN.
- Yeats, M. (1974). *An Introduction to Quantitative Analysis in Human Geography*. New York: McGraw, Hill.
- United Nations (2017). *Handbook on Measuring International Migration through Population Censuses*. Department of Economic and Social Affairs Statistics Division
- United Nations (). *Manual VI, Methods of Measuring Internal Migration*. Department of Economic and Social Affairs, Population Studies No. 47

Semester: IV

Population Geography Specialization (C)

Paper Title: Environment and Sustainable Development

Paper code: GEOSPL25064

Credits: 4

Marks: 100

Course Objectives:

- Provide a comprehensive understanding of environmental concepts and sustainable development principles, emphasizing their interrelationships.
- Explore global environmental issues and sustainable development goals (SDGs), focusing on their significance, challenges, and implementation strategies.

Course Outcomes:

- Explain the components and types of environment, and analyze human-environment interactions.
- Describe the principles and pillars of sustainable development and discuss their application in economic, social, and environmental contexts.
- Evaluate causes, impacts, and mitigation strategies related to climate change.
- Assess biodiversity loss, its consequences, and conservation measures.
- Identify types, sources, impacts, and control measures of pollution.
- Analyze resource depletion, types of natural resources, and strategies for sustainable management.
- Discuss selected SDGs relevant to geography, including their objectives, challenges in implementation, and roles of stakeholders like governments, NGOs, and international organizations.

Unit I: Introduction to Environment and Sustainable Development

Concept of Environment: Definition, components, and types of environment, Human-environment interactions

Concept of Sustainable Development: Definition and history - Principles and pillars of sustainable development (economic, social, and environmental)

Unit II: Global Environmental Issues

Climate Change: - Causes, impacts, and mitigation strategies

Biodiversity Loss: - Causes, impacts, and conservation strategies

Pollution: - Types, sources, impacts, and control measures

Resource Depletion: - Types of natural resources, overexploitation, and sustainable management

Unit III: Sustainable Development Goals (SDGs)

Overview of SDGs: - History and significance of the SDGs - Detailed study of selected SDGs relevant to geography

Implementation and Monitoring: - Strategies for achieving SDGs - Role of governments, NGOs, and international organizations

Unit IV: Human-Environment Interactions

Land Use and Land Cover Change: - Causes, impacts, and sustainable management
Urbanization and Environment: - Impacts of urbanization on the environment and sustainable urban planning
Agriculture and Environment: - Sustainable agricultural practices and their environmental impacts
Energy and Environment: - Renewable and non-renewable energy sources, and sustainable energy strategies

Suggested Reading:

Cunningham, William and Cunningham, Mary (214).Environmental Science: A Global Concern. McGraw Hill-Education.
Brundtland, G.H. (1987). Our Common Future: Report of the World Commission on Environment and Development. Geneva, UN-Dokument A/42/427
Devaki, N (2019). Education for Sustainable Development.Shanlax Publications.
Fulekar, MH & Dubey, Shanker (2023).Climate Change and Sustainable Development.CRC Press.
Gope, Arjun; Sarkar, Abhijit; Sarkar, Prasamita; Majumder, Santanu & Gosai, Kuldip (2019).Environmental Issues & Sustainable Development.Notion Press.
Nwanze, Kanayo F (2017). A Bucket of Water: Reflections on sustainable rural development. Practical Action Publishing.
Satsangi, Prem Saran & Dhir, Arsh (2024).Role of Communities in Achieving Sustainable Development.Academic Foundation.

Paper Title: Health Geography

Paper Code: GEOSPL25074

Credit: 4

Marks: 100

Course Objectives:

- Examine the concepts, determinants, and healthcare systems in health geography, with a focus on India's health scenario and healthcare programs.
- Analyze the socio-economic, environmental, and cultural factors influencing health outcomes and healthcare access in India.

Course Outcomes:

- Define and apply various approaches to studying health geography, including cartographic, behavioural, ecological, welfare, and geographic approaches.
- Describe the concepts of health, disease, morbidity, prevalence, incidence, and the International Classification of Diseases (ICD).
- Evaluate geographical determinants such as climate, altitude, water quality, air quality, and natural disasters on health outcomes.
- Analyze socio-economic determinants like income, education, workspaces, and socio-cultural factors including dietary habits, beliefs, gender roles, and social support systems affecting health in India.
- Discuss epidemiological transitions and lifestyle diseases prevalent in India such as obesity, hypertension, and diabetes.
- Explain the three-tier healthcare system in India (primary, secondary, tertiary) and the norms for healthcare facilities (Sub-Centre, PHC, CHC, District Hospital).

- Assess healthcare delivery mechanisms, traditional and alternative medicine systems, health seeking behaviour, and the burden of disease in India.

Unit I: Concepts

Defining Health Geography; Approaches to study Health Geography: Cartographic, Behavioural, Ecological, Welfare, and Geographic approach
 Concept of Health, its measurement and data source
 Concept of disease: Communicable and non-communicable diseases
 Concept of Morbidity, prevalence and incidence of diseases
 International Classification of diseases
 Healthcare belief model

Unit II: Health scenario in India

Geographical Determinants of health: Climate, Altitude, Water quality, Air Quality, Natural Disaster
 Socio-Economic determinants of health: Income, Education, and Work spaces
 Socio-Cultural determinants of health: Dietary habits and preferences, Beliefs and Cultural Practices, Gender Role, Social Support System
 Epidemiological transition in India
 Dietary habit and nutritional level
 Out of pocket expenditure on healthcare
 Life style disease: Obesity, Blood pressure, Diabetes
 Socio-economic and Environmental determinants of health

Unit III: Healthcare system in India

Three tier system of healthcare: Primary, Secondary and Tertiary
 IPHS norm for Sub-Centre, Primary Health Centre, Community Health Centre, District Hospital
 Healthcare delivery mechanism
 Traditional and Alternative medicine system
 Health seeking behavior
 Burden of disease in India
 Spatial analysis of healthcare access: Accessibility, Availability, Affordability, and Acceptability

Unit VI: Healthcare programs in India

Importance of health Insurance
 Malaria, Tuberculosis
 National Health Mission 2013
 Janani Shishu Suraksha Karyakarm (JSSK)
 National Programme on Climate Change & Human Health
 Roles and Responsibilities of ASHA and Anganwadi Workers
 National Vector Borne Diseases Control Programme
 Kayakalp (Extension of Swach Bharat Abhiyan)
 Pradhan Mantri National Dialysis Programme (PMNDP)
 National Programme on Climate Change & Human Health

Suggested Readings:

Izhar, Nilofar (2011). Introduction to Geography of Health, in Nilofar Izhar (ed) Geography and Health, A study in Medical Geography, APH Publishing Corporation, New Delhi.
Misra, RP (2007). Geography of Health, A treatise on Geography of life and death in India. Concept Publishing Company, New Delhi.
Park, K. (2021). *Text Book of Preventive and Social Medicine* (26th ed.). Banarsidas Bhanot Publishers.
Rajput, Swati (2024). *Geography of Health*. Concept Publishing Company Pvt. Ltd. New Delhi.
Thamilarasan, M (2016). *Medical Sociology*. Rawat Publications, New Delhi.

Paper Title: Gender Geography

Course Code: GEOSPL25084

Credit: 4

Marks: 100

Course Objectives:

- Explore the concepts, theories, and historical perspectives of gender geography, focusing on the intersectionality of gender with race, class, and sexuality.
- Analyze the spatial dimensions of gender, including gendered divisions of space, power dynamics, representation, and the impacts of globalization and development on gendered landscapes.

Course Outcomes:

- Define and discuss key concepts in gender geography such as patriarchy, matriarchy, masculinities, queer geographies, and feminist perspectives.
- Evaluate historical and theoretical perspectives on gender and space, highlighting the evolution of feminist geographies and their contributions.
- Analyze gendered divisions of space in urban, rural, and suburban environments, and assess the role of architecture and urban planning in shaping gendered experiences.
- Examine the gendered experiences of mobility, transportation, and the division of labor within domestic spaces.
- Critically analyze media representations of gender and place, and explore gendered landscapes of political power and activism.
- Discuss indigenous perspectives on gender and land, highlighting the intersection of culture, identity, and geography.
- Assess the gendered impacts of globalization and neoliberalism on landscapes, livelihoods, and national policies, and analyze the role of gender audits and gender budgets in addressing gender disparities.

Unit I: Introduction to Gender Geography

Definitions and concepts of gender geography

Historical and theoretical perspectives on gender and space

Intersectionality with race, class, and sexuality in geographical contexts

Concepts on feminist geographies, masculinities, queer geographies

Concept of Patriarchy, Matriarchy, Matriliney and Matrilocality

Unit II: Gendered Spaces and Places

Gendered divisions of space in urban, rural, and suburban environments
Gender and the built environment: architecture, urban planning
Gendered experiences of mobility and transportation
Domestic spaces and the gendered division of labor within the home
Case studies examining gendered spaces and places across different geographical contexts

Unit III: Power, Representation, and Identity

Gender, power, and representation in geographical discourses
Media representations of gender and place
Gendered landscapes of political power and activism
Indigenous perspectives on gender and land

Unit IV: Globalization, Development, and Gender

Concept of Gender Audit, Role of Gender Budget in bridging Gender Gap;
Empowerment of women (through education, economic opportunities, access to reproductive health services, involvement in decision making processes in various sectors)
Gendered impacts of globalization and neoliberalism on landscapes and livelihoods
Gender, development, and national policies

Suggested Books:

- Agarwal, Bina. (1994). *Afield of one's own: Gender and land rights in South Asia*. Vol. 58. Cambridge: Cambridge University Press
- Ghadially, Rehana, (2007). *Urban women in contemporary India: a reader, (ed.)*. New Delhi: Sage Publications.
- Gillian, Rose. (1993). *Feminism and Geography: the limits of geographical knowledge*. Minnesota: University of Minnesota Press
- James K. S. (2010): "Population , Gender and Health in India", Academic Foundation Radiant Book
- McDowell, Linda. (1992). "Doing gender: feminism, feminists and research methods in human geography." *Transactions of the institute of British Geographers*: 399-416.
- McDowell, Linda. (1999). *Gender, identity and place: Understanding feminist geographies*. Minnesota: University of Minnesota Press
- Mies, Maria. (1998). *Patriarchy and accumulation on a world scale: Women in the international division of labour*. New York: Palgrave Macmillan.
- Nongbri, Tiplut. (2003). *Development, ethnicity and gender: select essays on tribes in India*. Jaipur: Rawat Publications
- Raju, Saraswati, and Kuntala Lahiri-Dutt. (2011). *Doing gender, doing geography: emerging research in India*, (ed.). London: Routledge
- Raju, Saraswati. (2011). *Gendered Geographies: Space and Place in the South Asia*, (ed.). New Delhi: Oxford University Press.
- Sharma, K. L. (ed) (2001), "Social Inequality In India", Berkeley, University of California Press.
- Women and Geography Study Group. (1984). *Geography and gender: an introduction to feminist geography*. London: Hutchinson Education

Paper Title: Tribal geography

Paper Code: GEOSPL25094

Credit: 4

Marks: 100

Course Objectives:

- Examine the socio-cultural, ecological, and economic aspects of tribal communities in India, focusing on their characteristics, traditional knowledge, mobility, and challenges.
- Analyze the spatial distribution, typology, and constitutional safeguards for tribal populations, alongside policies aimed at addressing their issues.

Course Outcomes:

- Define Scheduled Tribe (ST) and distinguish between tribe and Scheduled Tribe based on legal definitions and characteristics.
- Describe the spatial distribution of scheduled tribes in India with a focus on specific regions like the Bodoland Territorial Region (BTR).
- Evaluate traditional ecological knowledge among tribes, including practices related to irrigation, food preservation, traditional medicine, and handicrafts.
- Discuss the impact of displacement due to developmental projects, national parks, and forest dependence on tribal communities.
- Analyze social mobility among tribes, exploring processes such as tribalization, de-tribalization, and re-tribalization, alongside aspects of tribal marriage and religion.
- Identify and assess the challenges faced by tribal populations, including geographical separation, cultural, social, economic, educational, and health-related problems.
- Evaluate constitutional safeguards like Tribal belts and blocks, the Sixth Schedule, and the Forest Rights Act aimed at addressing tribal issues and promoting their socio-economic development.

Unit I: Understanding tribals

Defining Scheduled Tribe; Understanding the difference between tribe and Scheduled Tribe;
Characteristics of Tribe;
Spatial distribution of scheduled tribes in India, Bodoland Territorial Region
Typonomy

Unit II: Tribal ecology

Traditional knowledge: Irrigation system, food preservation, traditional medicine, alcohol preparation, handloom and textile; Sacred groves
Displacement of tribals from their habitat: dam construction, developmental activities, national park, Tribal dependence on forest

Unit III: Mobility of tribes

Meaning and types of social mobility; Social process: Tribalization, De-tribalization, Re-triballization; Tribal marriage, Tribal religion

Unit IV: Challenges of tribal population

Geographical separation; Cultural Problems; Social Problems; Economic Problems; Problems of Education; Problems of Health and Sanitation; Views to solve tribal problems; Constitutional safeguards to tribals: Tribal belts and blocks, Sixth schedule; Forest Rights Act

Suggested Readings:

- Goswamy, Bhupendra Nath (2017). Political Ecology of Deforestation and Tribal Life. Concept Publishing Company Pvt. Ltd.
- Husain, Majid (2018). Human Geography, 5th Edition. Rawat Publications.
- Mukhopadhyay, Srimanta (2013). Human Geography of Tribal Region. Satyam Publishing House.
- Rao, CN Shankar (2019). Indian Social Problems, A Sociological Perspective. S Chand and Company Limited.
- Rao, CN Shankar (2019). Principles Of Sociology, With an Introduction to Social Thoughts. S Chand and Company Limited.
- Sen, J. (2019). A Textbook of Social and Cultural Geography. Kalyani Publishers.
- Shah, Mihir; Vijayshankar, PS & BRL Foundation (2022). Tribal Development Report: Human Development and Governance. Routledge India.

Paper Title: Practical-IV

Paper Code: GEOSPL25104

Credit: 4

Marks: 100

Unit I: SPSS for Geographic data analysis

- Familiarization with SPSS environment
- Creation of data frame
- Reading Excel, CSV file
- Data transformation: Recoding variable, Computing variable
- Generating tables: Uni variate, Bi-variate and Multi-variate tables

Unit II: R & Stata for Geographic data analysis

- R Environment
- Input, Import and Export of data
- Measures of central tendency
- Graphs
- Stata Environment
- Data transformation: Recoding variable, Computing variable
- Generating tables: Uni variate, Bi-variate and Multi-variate tables

Unit III & IV: Field work

The students, in consultation with assigned faculty, are required to collect data from a selected study area. The issues pertaining to Health, Gender and Tribal issues needs to be covered. The collected data should be analyzed in one of the data analysis software packages taught in the semester.

Based on the collected data a group field reports covering the Health, Gender and Tribal issues needs to be prepared. A group may comprise of 4-8 students. A group report should be prepared within a page limit of 20, inclusive of everything.

Suggested Readings:

- Acock, Alan C (2014). *A Gentle Introduction to Stata*, 4th Edition. A Stata Press Publication
StataCorp LP, College Station, Texas.
- Daniels, Lisa and Minot, Nicholas (2019). *An Introduction to Statistics and Data Analysis Using Stata®*, From Research Design to Final Report. Sage Publications.
- Field, A. (2009). *Discovering Statistics using SPSS*, Third Edition. Sage Publications.
- Gregory, S. (1978). *Statistical Methods and the Geographer*. London: Longman.
- IBM. *IBM SPSS Statistics 25 Core System User's Guide*. IBM
- IBM. *IBM SPSS Statistics 25 Brief Guide*. IBM
- Johnston, R. J. (1973). *Multivariate Statistical Analysis in Geography*. London: Longman.
- King, L. J. (1969). *Statistical Methods in Geographical Studies*. London.
- King, J. P. C. and C. A. M. (1968). *Quantitative Geography*. London: John Wiley.
- Mahmood, A. (1977). *Statistical Methods in Geographical Studies*. Delhi: Concept Publications.
- McCullagh, H. R. and P. S. (1974). *Quantitative Techniques in Geography: An Introduction*.
Oxford: Clarendon Press.
- Paul, S. K. (1998). *Statistics for Geoscientists*. New Delhi: Tata McGraw Hill.
- Robinson, G. M. (1998). *Methods and Techniques in Human Geography*. Chichester: John Wiley & Sons.
- Stockemer, Daniel (2019). *Quantitative Methods for the Social Sciences, A Practical Introduction with Examples in SPSS and Stata*. Springer.
- Yeats, M. (1974). *An Introduction to Quantitative Analysis in Human Geography*. New York: McGraw, Hill.
- Unwin, D. (1981). *Introductory Spatial Analysis*. London: Methuen.
