CURRICULUM FOR
FOUR-YEAR UNDERGRADUATE PROGRAMME OF
GEOGRAPHY

AS PER FRAMEWORK OF NEP-2020

Department of Geography
Nagaland University
2025

1. MINIMUM CREDIT REQUIREMENTS TO AWARD DEGREE UNDER EACH CATEGORY

Sl. No.	Broad Category of Course	Minimum Credit Requirement	
		3-year UG	4-year UG
1	Major (Core)	60	80
2	Minor Stream	24	32
3	Multidisciplinary Courses	09	09
4	Ability Enhancement Courses (AEC)	08	08
5	Skill Enhancement Courses (SEC)	09	09
6	Value Added Courses common for all UG	06-08	06-08
7	Summer Internship	02-04	02-04
8	Research Project/ Dissertation	-	12
	Total Credits	120	160

2. COURSE STRUCTURE FOR CURRICULUM AND CREDIT FRAMEWORK FOR UNDER GRADUATE PROGRAMME

SEMESTER-WISE COURSE AND CREDIT DISTRIBUTION OF UNDER GRADUATE PROGRAMME

Semester	Course Categories	Credits	Remark
I	**2 Major Courses [C-1, C-2], (4 + 4)**	8	Core papers of one discipline will be the Minor papers of other discipline
	1 Minor Course (4)	4	
	1 Multidisciplinary Course	3	
	1 Ability Enhancement course (AEC)	2	
	1 Skill Enhancement Course (SEC), (3)	3	
	Total	**20**	
II	**2 Major Courses [C-3, C-4], (4+4)**	8	
	1 Minor Course (4)	4	
	1 Multidisciplinary Course	3	
	1 Ability Enhancement Course (AEC)	2	
	1 Common Value-Added Course	3	
	Total	**20**	
Students exiting the programme after securing 40 credits will be awarded UG Certificate in the relevant Discipline / Subject provided they secure 4 credits in work based vocational courses offered during summer term or internship/ apprenticeship.			
III	**2 Major Courses [C-5, C-6], (4+4)**	8	
	1 Minor Course	4	
	1 Multidisciplinary Course	3	
	1 Ability Enhancement Course (AEC)	2	
	1 Skill Enhance Course (SEC), (3)	3	
	Total	**20**	
IV	**2 Major Courses [C-7, C-8], (4+4)**	8	
	1 Minor Course	4	
	1 Ability Enhancement Course (AEC)	2	
	1 Skill Enhancement Course (SEC)	3	
	1 Common Value-Added Course	3	
	Total	**20**	

Students exiting the programme after securing 80 credits will be awarded UG Diploma in the relevant Discipline / Subject provided they secure additional 4 credits in skill based vocational courses offered during first year or second year summer term.			
Semester	**Course Categories**	**Credits**	**Remark**
V	**3 Major Courses [C-9, C-10, C-11], (4+4+4)**	12	
	1 Minor Course (4)	4	
	1 Internship	2	
	1 Common Value-Added Course	2	
	Total	**20**	
VI	**4 Major Courses [C-12, C-13, C-14, C-15], (4+4+4+4)**	16	
	1 Minor Course (4)	4	
	Total	**20**	
Students who want to undertake 3-year UG programme will be awarded UG Degree in the relevant Discipline / Subject upon securing 120 Credits.			
VII	**4 Major Courses [C-16, C-17, C-18, C-19], (4+4+4+4)**	16	
	1 Minor Course (5)	5	
	Total	**20**	
VIII	1 Minor Course*	4	
	4 Major Courses [C-20,C-21, C-22, C-23] * /Research Project	12	
	Total	**20**	
Students will be awarded UG Degree (Honours) with Research in the relevant Discipline /Subject provided they secure 160 credits.			

3. CREDIT DISTRIBUTION

Science	**Remarks**	**Arts (Non-experimental)**	**Remarks**
Total Credit 4	Theory 3 + Practical 1	Total Credit 4	Theory 3 + Tutorial 1
Total Credit 5	Theory 3 + Practical 2	Total Credit 5	Theory 3 + Tutorial 2

GEOGRAPHY COURSE STRUCTURE: CORE PAPERS

Paper Code	Title of the paper	Total Credit	Page No
FIRST SEMESTER			
C-1	Physical Geography	4	8
C-2	Human Geography	4	9
SECOND SEMESTER			
C-3	Geomorphology	4	10
C-4	Cartographic Techniques	4	11
THIRD SEMESTER			
C-5	Geography of India	4	12
C-6	Economic Geography	4	13
FOURTH SEMESTER			
C-7	Resource geography	4	14
C-8	Agricultural geography	4	15
FIFTH SEMESTER			
C- 9	Regional Planning and Development	4	16
C-10	Political Geography	4	17
C-11	Environmental Geography	4	18
SIXTH SEMESTER			
C-12	North East India with special focus on Nagaland	4	19
C-13	Climatology & Oceanography	4	20
C-14	Hydrology & Soil studies	4	21
C-15	Evolution of Geographical Thought	4	22
SEVENTH SEMESTER			
C-16 (A)	Disaster Management	4	23
C16 (B)	Geography of Health	4	24
C-17	Statistical Methods in Geography	4	25
C-18	Urban Geography	4	26
C-19	Research Methodology	4	27
EIGHTH SEMESTER			
C-20	Sustainable Development	4	28
C-21	Biogeography	4	29
C-22	Advanced Geomorphology	4	30
C-23	Fundamentals of Geospatial Science	4	31

	Minor Papers			
Semester	**Paper code**	**Name of the Paper**	**Credits**	**Page No.**
I	M1	Physical Geography	4	8
II	M2	Geomorphology	4	10
III	M3	Geography of India	4	12
IV	M4	Resource geography	4	14
V	M5	Regional Planning and Development	4	16
VI	M6	North East India with special focus on Nagaland	4	19
VII	M7 (A) M7 (B)	Disaster Management Geography of Health	4	23
VIII	M8	Sustainable Development	4	28

Skill Enhancement Courses (3 Credits Each)
(refer to common pool)

Semester	Course Code	Title of the Paper	Page No
FIRST	SEC S1	Thematic maps	31
THIRD	SEC S3	Remote Sensing	32
FOURTH	SEC S4	Geographical Information System	33

The Semester-wise and Broad Course Category-wise Distribution of credits of the Undergraduate Programme:

Sem	Discipline Specific Courses – Core	Minor	Interdisciplinary/ Multidisciplinary courses	Ability Enhancement Courses (language)	Skill Enhancement Courses /Internship /Dissertation	Common Value-Added Courses	Total Credits
1	2	3	4	5	6	7	8
I	C1- Physical Geography C2 -Human Geography	M1	Environmental Science 3 credits	ENG-I (2 credit)	SEC S1 Thematic Maps (common pool)		20
II	C3 -Geomorphology C4 -Cartographic Techniques	M2	Common pool/ Swayam 3 credits	MIL-I (2 credit)		Soft Skill 3 credit	20
	Students exiting the programme after securing 40 credits will be awarded UG Certificate in the relevant Discipline /Subject provided they secure 4 credits in work based vocational courses offered during summer term or internship / Apprenticeship in addition to 6 credits from skill-based courses earned during first and second semester.						*40*
III	C5 - Geography of India C6 - Economic Geography	M3	Understanding Heritage/ Common pool/ Swayam 3 Credit	ENG-2 (2 credit)	SEC S3 Remote Sensing (common pool)		20
IV	C7- Resource geography C8 -Agricultural Geography	M4		MIL-2 (2 credit)	SEC S4 Geographical Information System (common pool)	NCC/NSS/CP (3 credit)	20
	Students exiting the programme after securing 80 credits will be awarded UG Diploma in the relevant Discipline /Subject provide d they secure additional 4 credit in skill based vocational courses offered during first year or second year summer term.						*80*
V	C9 -Regional Planning and Development C10 -Political Geography C11- Environmental Geography	M5			(Internship) 2 credit	Work Ethics (2 credit)	20

VI	C12- North east India with special focus on Nagaland C13- Climatology & Oceanography C14- Hydrology & Soils C15- Evolution of Geographical Thought	**M6**					**20**
	Students who want to undertake 3-year UG programme will be awarded UG Degree in the relevant Discipline /Subject upon securing 120 credits						*120*
VII	C16 (A)-Disaster Management C16(B) -Geography of Health C17- Statistical Methods in Geography C18- Urban Geography C19- Research Methodology	M7			Research dissertation will start		**20**
VIII	C20- Sustainable Development C21- Biogeography C22-Advanced Geomorphology C23- Fundamentals of Geospatial Science	**M8**			(Research Project/ Dissertation)		**20**
	Students will be awarded UG Degree (Honours) with Research in the relevant Discipline /Subject provided they secure 160 credits						*160*

Semester I

Course name: Physical Geography

Paper Code: C1

Total Credits: 4

Course Objectives

- This paper introduces students to the field of Physical Geography and its specificities inter-relationship with other branches of Physical and Social Sciences
- It seeks to understand the Origin of the Earth and the dynamic geomorphic processes responsible for development of major landforms of varied types and nature.
- To teach students about the origin and types of rocks, as well as the formation and types of soil.

Course outcomes

- After gaining knowledge based on the contents embodied in this paper, the students will
  be able to realise the importance of the nature and scope of Physical Geography.
- The paper will be very useful for students preparing for UGC NET-JRF / SLET exam and other competitive exams, including civil services

Theory **Credit 3**

1. Physical geography- nature and scope: Branches of physical Geography: relation of Geography with physical Science (Geology, Meteorology, & Hydrology) and Social Sciences (Economics, Political Science, Anthropology and History)
2. Origin of Solar System and Earth (Tidal Hypothesis of Jeans and Jeffreys, Gaseous Theory by Kant, Nebular Hypothesis of Laplace and Big Bang theory)
3. Earth's Crust (Endogenetic and Exogenetic forces)
4. Major landforms (Types and classification of Mountains, Plateau and Plains)
5. Origin and types of rocks; Classification of igneous, sedimentary and Metamorphic rocks

Practical **Credit 1**

1. Relief representation from the topographical sheet (V-shaped valley, U-shaped valley, waterfall, cliff).
2. Construction of graphical scale (linear, diagonal and comparative), conversion of map scale.
3. Viva voce and practical notebook.

Reading List

1. Bryant, H. Richard (2001): Physical Geography Made Simple, Rupa and Company, New Delhi.
2. Negi, B.S (2000): Physical Geography, Kedar Nath Ram Nath, Meerut
3. Singh, S. (2003): Physical Geography, Physical Geography, Prayag Pustak Bhawan, Allahabad.
4. Sharma, Y.K. (2007): Physical Geography, Lakshmi Narain Agarwal, Agra
5. Thornbury, W.D. (1960): Principles of Geomorphology, John Willey and Sons, New York.

Semester I
Course name: Human Geography
Paper Code: C 2
Total Credits: 4

Course objectives

- This paper is a core paper that intends to introduce students to human geography and how humankind transforms and gets transformed by geographic space.
- It seeks to develop new insights among students on the relevance of human-environmental relationships and how a spatial perspective shapes these relationships.

Course outcomes

- The paper will be useful for students in developing ideas on human-environment issues that geographers usually address in the anthropocene.
- The paper will be useful for students preparing for UGC NET/SLET exams and other competitive exams including the civil service.

Theory **Credit 3**

1. Meaning, nature and scope of Human Geography; Development and branches of Human Geography.
2. Space and Society; Race; Religion and Language.
3. Population: Population Growth and demographic transition theory; Factors influencing distribution of population; density of population.
4. Migration: Factors influencing migration; types of migration; consequences of migration.
5. Settlements: Geographical factors influencing human settlement. Origin and growth of Rural and Urban settlements. Rural Settlements: Types and pattern; Urban Settlements: Morphology and functional classification.

Practical **Credit 1**

1. Representation of population data by point (Dot and Proportionate Circles).
2. Graphical representation and analysis- Age-Sex pyramids.
3. Viva voce and practical notebook.

Reading List

1. Chandna, R.C. (2010) Population Geography, Kalyani Publisher.
2. Hussain,Majid, N (2018) Human Geography, Rawat Publications, Jaipur
3. Hassan, M.I. (2005) Population Geography, Rawat Publications, Jaipur
4. Daniel, P.A. and Hopkinson, M.F. (1989). The Geography of Settlement, Oliver & Boyd, London.
5. Johnston R; Gregory D, Pratt G. et.al. (2008). The Dictionary of Human Geography, Blackwell Publication.

Semester II

Course name: Geomorphology
Paper Code- C3
Total Credit: 4

Course objectives

- To provide a general idea about the topographic and surficial characteristics of the earth's surface to the students.
- To make the students aware about the dynamic geomorphic processes responsible for development of landforms of varied types and nature.
- To impact applied scientific knowledge on landform development based on geomorphic concepts, principles and theories.

Course Outcomes

- The students will learn that the earth is undergoing constant changes due to dynamic earth's processes.
- To know about the meaning and scope of geomorphology, which a major branch of Physical Geography.
- After gaining knowledge based on the contents embodied in this paper, the students will be able to realize the importance of geomorphological knowledge as applied in various developmental activities executed on the land and over the earth's surface.

Theory **Credits 3**

1. Nature and scope; Development of Geomorphology- Geomorphological school in USA, Europe and India
2. Earth's interior; Wegener's theory of Continental Drift; Plate Tectonics.
3. Geomorphic Processes- Weathering, Mass Wasting; Drainage patterns and types.
4. Cycle of Erosion (Davis and Penck)
5. Evolution of Landforms (Erosional and Depositional)- Fluvial, Karst, Aeolian, Glacial, and Coastal.

Practical **Credit 1**

1. Preparation of profile (serial, superimposed, projected and composite).
2. Preparation of Slope Map/ Relative Relief Map using Wentworth's method and Smith's method.
3. Viva voce and practical note book.

Reading List

1. Bloom A. L., 2003: Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of India, New Delhi.
2. Bridges E. M., 1990: World Geomorphology, Cambridge University Press, Cambridge.
3. Christopherson, Robert W., (2011), Geosystems: An Introduction to Physical Geography, 8 Ed., Macmillan Publishing Company.
4. Kale V.S. and Gupta A., 2001: Introduction to Geomorphology, Orient Longman, Hyderabad.
5. Knighton A. D., 1984: Fluvial Forms and Processes, Edward Arnold Publishers, London.
6. Selby, M.J., (2005), Earth's Changing Surface, Indian Edition, OUP
7. Thornbury W. D., 1968: Principles of Geomorphology, Wiley.

Semester II

Course name: Cartographic Techniques

Paper Code- C4
Total Credit: 4

Course objectives

- Understanding the importance of various cartographic techniques in geographical study.
- General understanding of map scale and map content for topographical map interpretation.
- Acquaintance of different cartographic techniques for measurement and representation of various facets of topography or terrain condition of any area.

Course outcomes

- Understand the historical evolution of maps
- Acquires skills in enlargement and reduction of maps
- Understand the principles of Map Design and acquire skills in geometrical construction of map projections
- The students will understand the maps prepared for various users/purposes

Theory **Credits 3**

1. Cartography – Meaning, Scope and Branches of Cartography.
2. Development of cartography- Ancient period, Medieval period, Early Modern period and Recent period
3. Map Scales– Concept, types of scales and their conversion; representation of point, line and area in maps.
4. Study of Topographical Maps: Topographical map content and numbering system, general interpretation of toposheets in respect of physical and cultural details.
5. Map Projections– Concept of Map Projection, Classification of Map Projections, and basic properties and uses.

Practical **Credit 1**

1. Enlargement and reduction of maps.
2. Construction of graticules of Cylindrical Equal-area projection, Polar Orthographic projection, along with their properties, uses, and limitations.
3. Viva voce and practical notebook.

Reading List

1. Gupta K.K. and Tyagi, V.C., 1992: Working with Map, Survey of India, DST, New Delhi.
2. Mishra R.P. and Ramesh, A., 1989: Fundamentals of Cartography, Concept, New Delhi.
3. Rhind D. W. and Taylor D. R. F., (eds.), 1989: Cartography: Past, Present and Future, Elsevier, International Cartographic Association.
4. Singh R.L. and Singh R.P.B., 1999: Elements of Practical Geography, Kalyani Publishers.
5. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan

Semester III

Course Name: Geography of India

Paper Code: C5

Total Credits: 4

Course objectives

- This paper intends to introduce students to the India as a geographical entity.
- To develop new insights among students on the relevance of geographical studies and India's geographical issues.

Course outcomes

- The paper will be useful for students in developing perspectives on Indian geography and its systematic study.
- The paper will be useful for students preparing for UGC NET/SLET exams and other competitive exams including the civil services

Theory **Credits 3**

1. Physical: Physiographic Divisions, soil and vegetation, climate
2. Population: Factors influencing spatial distribution; density and growth.
3. Social: Distribution of population by religion and language.
4. Economic: Mineral and power resources-distribution and utilization of iron ore, coal, petroleum; Agricultural- production and distribution of rice and wheat.
5. Transport: Roads, railways and air transport.

Practical **Credits 1**

1. Monthly temperature and rainfall graphs of selected stations from different physiographic regions of India.
2. Spatial density of Population using Choropleth.
3. Viva voce and practical note book.

Reading List

1. Deshpande C.D., 1992: India: A Regional Interpretation, ICSSR, New Delhi.
2. Johnson, B.L.C., ed. 2001. Geographical Dictionary of India. Vision Books, New Delhi.
3. Sdyasuk Galina and P. Sengupta (1967): Economic Regionalisation of India, Census of India
4. Sharma, T.C. 2003: India- Economic and Commercial Geography. Vikas Publ., New Delhi.
5. Singh R. L., 1971: India: A Regional Geography, National Geographical Society of India.
6. Tirtha, Ranjit 2002: Geography of India, Rawat Publs., Jaipur & New Delhi.
7. Tiwari, R.C. (2007) Geography of India. Prayag Pustak Bhawan, Allahabad
8. Sharma, T.C. (2013) Economic Geography of India. Rawat Publication, Jaipur

Semester III

Course name: Economic Geography

Paper Code- C6
Total Credit: 4

Course objectives

- This paper is a core paper that intends to introduce students to the principles of economic geography
- It seeks to develop new insights among students on the relevance of economy and geography and associated problems in contemporary times.

Course Outcomes

- The paper will be useful for students in developing ideas on how geographical aspects organise economic space and will offer perspectives to students if they wish to pursue a research programme.
- The paper will be useful for students preparing for UGC NET/SLET exams and other competitive exams, including the civil services.

Theory — Credits 3

1. Introduction: Concept and classification of economic activity; Theories- Agriculture (Von Thunen theory), Industry (Weber's theory).
2. Primary Activities: Subsistence and Commercial agriculture, forestry, fishing and mining.
3. Secondary Activities: Manufacturing (Cotton Textile, Iron and Steel),
4. Tertiary Activities: Transport and communication- air, water and land transport,
5. Bases of International trade; major trading blocs-EU and ASEAN.

Practical — Credit 1

1. Representation of economic data by graph (line, bar,).
2. Representation of economic data by statistical diagrams (pie and block pile diagram).
3. Viva voce and practical note book.

Reading List

1. Alexander J. W., 1963: Economic Geography, Prentice-Hall Inc., Englewood Cliffs,New Jersey.
2. Coe N. M., Kelly P.F. and Yeung H.W., 2007: Economic Geography: A ContemporaryIntroduction, Wiley-Blackwell.
3. Hodder B. W. and Lee Roger, 1974: Economic Geography, Taylor and Francis.
4. Combes P., Mayer T. and Thisse J. F., 2008: Economic Geography: The Integration ofRegins and Nations, Princeton University Press.
5. Wheeler J. O., 1998: Economic Geography, Wiley.
6. Durand L., 1961: Economic Geography, Crowell.
7. Bagchi-Sen S. and Smith H. L., 2006: Economic Geography: Past, Present and Future,Taylor and Francis.
8. Mahmood A., 1977: Statistical Methods in Geographical Studies, Concept.
9. Pal S. K., 1998: Statistics for Geoscientists, Tata McGraw Hill, New Delhi.

Semester IV

Course name: Resource Geography

Paper Code- C7
Total Credit: 4

Course objectives

- This theory course basically deals with concept of resource and its classification, and the distribution, utilization and management of land, water, forest and energy resources.
- It also focuses on the natural resource base and its problems of conservation and management.
- It also provides basic idea about sustainable development of resources.

Course outcomes

- Understanding the basic concept of resource and its various types and their utilities
- Acquiring basic information about potentials and management of resources like land, water, forest and power in global context.
- Understanding the prevailing natural resource potentials and problems of management.

Theory **Credits 3**

1. Definition, Nature and Scope of Resource Geography: Types of resources
2. Distribution, Utilization, Problems and Management of Mineral Resources (Coal, Petroleum) and Water Resources.
3. Distribution, Utilization, Problems and Management of Forests and Energy Resources
4. Issues Related to Human resources: Social and Demographic issues; Carrying Capacity of the land.
5. Conservation of natural resources and Sustainable Resource Development

Practical **Credit 1**

1. Satellite imagery interpretation- Forest cover, Water bodies.
2. Representation of Human Development Index in India using choropleth method.
3. Viva voce and practical notebook.

Reading List

1. Cutter S. N., Renwich H. L. and Renwick W., 1991: Exploitation, Conservation, Preservation: A Geographical Perspective on Natural Resources Use, John Wiley and Sons, New York.
2. Gadgil M. and Guha R., 2005: The Use and Abuse of Nature: Incorporating This Fissured Land: An Ecological History of India and Ecology and Equity, Oxford University Press. USA.
3. Jones G. and Hollier G., 1997: Resources, Society and Environmental Management, Paul Chapman, London.
4. Klee G., 1991: Conservation of Natural Resources, Prentice Hall, Englewood.
5. Mather A. S. and Chapman K., 1995: Environmental Resources, John Wiley and Sons, New York.

Semester IV

Course name: Agricultural Geography

Paper Code- C 8
Total Credits: 4

Course objectives

- This paper introduces students to the field of agricultural geography and its specificities
- It seeks to develop new insights among students on the relevance of agriculture and allied activities shape the economy and geography of an area, region, country or the globe.

Course outcomes

- The paper will be useful for students in developing ideas on how geographical factors tangent on agricultural activities and how geographers seek to address issues of agricultural development and agricultural disparities.
- It will build skills for students seeking to enroll in a research programme and/or provide openings for them with agricultural /rural planning agencies

Theory **Credits 3**

1. Introduction, nature and scope; definition and classification of land use/land cover.
2. Determinants of Agriculture: Physical, Technological and Institutional.
3. Agricultural Regions of India: Agro-climatic, Agro-ecological & Crop Combination Regions.
4. Agricultural Systems of the World (Whittlesey's classification) and Agricultural Land use model (Von Thunen, modification and relevance).
5. Agricultural Revolutions in India: Green, White, Blue, Pink

Practical **Credit 1**

1. Preparation and interpretation of crop calendar using Ergograph.
2. Spatial variations in North East India with Pie diagram.
3. Viva voce and practical notebook

Reading List

1. Basu, D.N., and Guha, G.S., 1996: Agro-Climatic Regional Planning in India, Vol.I &II, Concept Publication, New Delhi.
2. Bryant, C.R., Johnston, T.R, 1992: Agriculture in the City Countryside, Belhaven Press, London.
3. Burger, A., 1994: Agriculture of the World, Aldershot, Avebury.
4. Ilbery B. W., 1985: Agricultural Geography: A Social and Economic Analysis, Oxford University Press.
5. Shafi, M., 2006: Agricultural Geography, Dorling Kindersley India Pvt. Ltd., New Delhi

Semester V

Course name: Regional Planning and Development

Paper Code- C 9

Total Credits: 4

Course objectives

- This paper intends to introduce students to the rationale underlying the relevance of balanced regional development and spatial inequalities in geography
- It seeks to develop new insights among students on the issue of development and disparities among geographical regions

Course outcomes

- The paper will be useful for students in developing ideas on disparities within and between countries and their fallout.
- The paper will help provide theoretical insights and perspectives to students if they wish to pursue a research program in future.
- The paper will be very useful for students preparing for UGC NET-JRF / SLET exam and other competitive exams including civil services

Theory Credits 3

1. Region: Concept, types and delineation of planning region.
2. Regional planning: Evolution and types; Objectives and principles of Regional Planning.
3. Regional Planning in India: Macro, meso and micro level planning; Local level planning and Panchayati Raj (GPDP); Participatory approach in planning; NITI Aayog.
4. Concept of Development and Regional Disparity, Concept of sustainable development, Measuring development: Indicators (Economic, Social and Environmental); Human development.
5. Planning regions of India with special reference to North-East India

Practical Credit 1

1. Preparation of flow cartogram to show volume of inter-state movement of different commodities in India/NE India.
2. Thematic maps- Delineation of functional regions.
3. Viva voce and practical note book

Reading List

1. Blij H. J. De, 1971: Geography: Regions and Concepts, John Wiley and Sons.
2. Claval P.l, 1998: An Introduction to Regional Geography, Blackwell Publishers, Oxford and Massachusetts.
3. Friedmann J. and Alonso W. (1975): Regional Policy- Readings in Theory and Applications, MIT Press, Massachusetts.
4. Gore C. G., 1984: Regions in Question: Space, Development Theory and Regional Policy, Methuen, London.
5. Gore C. G., Köhler G., Reich U-P. and Ziesemer, T., 1996: Questioning Development; Essays on the Theory, Policies and Practice of Development Intervention, Metropolis- Verlag, Marburg.

Semester V

Course name: Political Geography

Paper Code- C 10

Total Credits: 4

Course Objectives

- This paper seeks to introduce students to the geographical aspects behind political phenomena
- It seeks to develop new insights among students on the relevance of political geographical studies in a changing global scenario.

Course outcomes

- The paper remains useful for students in developing ideas on geopolitics and allied phenomena and will aid students who may pursue a research programme.
- The paper will be useful for students preparing for UGC NET/SLET exams and other competitive exams, including the civil services.

Theory Credit 3

1. Introduction: Concepts, Nature and Scope.
2. Concept of Nation and State; Attributes of State– Shape, Size, Territory and Sovereignty; Frontiers and Boundaries;
3. Development of Geopolitics, Concept of Organic state; Global strategic models (Heartland and Mahan's Sea power concept)
4. Electoral Geography – Geography of Voting, Geographic Influences on voting pattern, Geography of Representation, Gerrymandering.
5. Politics of Displacement; Issues of relief, compensation and rehabilitation with reference to Dams.

Practical Credit 1

1. Assess voting pattern of Nagaland (at least two terms) using graphical/ sphere method
2. Preparation of comparative map to show the spatial distribution of religion/ gender in India.
3. Viva voce and practical notebook.

Reading List

1. Agnew J., 2002: Making Political Geography, Arnold.
2. Agnew J., Mitchell K. and Toal G., 2003: A Companion to Political Geography, Blackwell.
3. Cox K. R., Low M. and Robinson J., 2008: The Sage Handbook of Political Geography, Sage Publications
4. Gallaher C., et al, 2009: Key Concepts in Political Geography, Sage Publications.
5. Mathur H M and M M Cernea (eds.) Development, Displacement and Resettlement-Focus on Asian Experience, Vikas, Delhi
6. Taylor P. and Flint C., 2000: Political Geography, Pearson Education.
7. Verma M K (2004): Development, Displacement and Resettlement, Rawat Publications, Delhi

Semester V

Course name: Environmental Geography
Paper Code- C 11
Total Credits: 4

Course Objectives

- This paper intends to introduce students to the geography and environment interface.
- It seeks to develop new insights among students on the relevance of environmental studies from a spatial perspective.
- The paper will enable the students to understand the various facets of the environment, its degradation, as well as management.
- To provide understanding and awareness of Environmental issues at the Global and regional level

Course outcomes

- The paper will be useful for students in developing ideas on environmental issues that geographers usually address.
- The paper will be useful for students preparing for UGC NET/SLET exams and other competitive exams including the civil services.

Theory **Credit 3**

1. Environmental Geography – Concept, Scope and Significance
2. Human-Environment Relationships – Historical Progression, Adaptation indifferent Biomes.
3. Eco-system: concept, types and components, structure and functions; Ecology–Concept and principles.
4. Major Global Environmental Problems: Pollution, Deforestation, Desertification, Global Warming, Bio-Depletion
5. Environmental Programmes and Policies – Global, National and Local

Practical **Credit 1**

1. Project on environmental problems of North East India (select any one state).

Reading List

1. Chandna, R. C., 2002: Environmental Geography, Kalyani, Ludhiana.
2. Singh, R.B. (Eds.) (2009) Biogeography and Biodiversity. Rawat Publication, Jaipur
3. MoEF, 2006: National Environmental Policy-2006, Ministry of Environment and Forests, Government of India.
4. Odum, E. P. et al, 2005: Fundamentals of Ecology, Ceneage Learning India.
5. Singh S., 1997: Environmental Geography, Prayag Pustak Bhawan. Allahabad.
6. Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) (2014) Climate change and biodiversity: Proceedings of IGU Rohtak Conference, Volume 1. Advances in Geographical and Environmental Studies, Springer

Semester VI

Course Name: North East India with Special Focus on Nagaland
Paper Code: C12
Total Credits: 4

Course objectives

- To introduce students to North East India as a geographical entity.
- To understand the geographical setting of North East India and Nagaland and to analyze the regions potentially for sustainable development

Course outcomes

- The paper will be useful for students in developing perspectives on geography of North East India and its systematic study.
- The paper will be useful for students preparing for UGC NET/SLET exams and other competitive exams including the civil services.

Theory **Credit 3**

1. North East India: Physical characteristics: Physiography, Drainage, Climate, Soil and Natural vegetation
2. Population of North East India: Growth, Distribution and Density, Age- Sex Composition, Rural-Urban Composition
3. Economy- Classification and types, Problems and Prospects (Agriculture, Industries, transport and Communication)
4. Nagaland: Physiography and Natural Vegetation; Biodiversity and its conservation issues.
5. Nagaland: Demographic characteristics- Population Growth, Distribution and Density, Age Sex Composition.

Practical **Credit 1**

1. Choropleth mapping to show density of population in Nagaland.
2. Types of Cartograms- Isochronic and Traffic flow.
3. Viva voce and practical notebook.

Reading List

1. Taher, M. and Ahmed, P. (Revised Edition, 2014): Geography of North East India, Mani Manik Prakash, Guwahati
2. Bhattacharyya, N.N. (2005): North East India: A Systematic Geography, Rajesh Pub. New Delhi.
3. Gopal Krishnan, R. Geography of North East India.
4. Gopal Krishnan, R. (1991): North East India: Land, People and Economy, Vikash Publishing House, New Delhi.
5. Sebu, Sonyhulo (2013): Geography of Nagaland, Spectrum Publications Guwahati, Delhi.
6. Singh, S. (1994): Agricultural Development in North East India: A Regional Analysis, Kaushal Publications, Shillong.

Semester VI

Course name: Climatology and Oceanography
Paper Code- C-13
Total Credit: 4

Course Objective

- This paper intends to introduce students to the rationale underlying climatological studies in geography
- It seeks to develop new insights among students on the relevance of climatic variable strengthening on climate change.

Course outcome

- The paper will be useful for students in developing ideas on climate related aspectsof geographical analyses.
- The paper will help provide theoretical insights and perspectives to students if they wish to pursue a research programme in future.
- The paper will be very useful for students preparing for UGC NET-JRF / SLET exam and other competitive exams including civil services.

Theory **Credit 3**

1. Definition and significance of Climatology; Composition and Structure of Atmosphere; Insolation and Heat Budget
2. Horizontal and vertical distribution of temperature; Atmospheric Pressure- Pressure belts; Types of winds.
3. Airmasses- meaning and characteristics; Fronts (formation, classification, and types); cyclones (temperate and tropical); Classification of world climate (Koppen, Thornthwaite);
4. Ocean Floor Topography and Oceanic water Movements: Waves, Currents and Tides.
5. Ocean Salinity and Temperature: Distribution and Determinants; Coral Reefs and Marine Deposits and Ocean Resources.

Practical **Credit 1**

1. Interpretation of weather map of India; Construction and interpretation of hythergraph and Climograph.
2. Bathymetric and Hypsometric Curve
3. Viva voce and practical notebook.

Reading List

1. Anikouchine, W. A. and Sternberg, R. W., (1973): *The World Oceans: An Introductionto Oceanography*, Prentice-Hall.
2. Barry, R. G., and Chorley, R. J., (2009): *Atmosphere, Weather and Climate (9th Edition)*,Routledge, New York.
3. Bhutani, S., (2000): *Our Atmosphere*, Kalyani Publishers, Ludhina. Critchfield, H. J., (1987): *General Climatology*, Prentice-Hall of India, New Delhi
4. Kershaw, S., (2000): *Oceanography: An Earth Science Perspective*, Stanley Thornes,UK.
5. Lutgens, F. K., Tarbuck E. J. and Tasa D., (2009): *The Atmosphere: An Introduction to Meteorology*, Prentice-Hall, Englewood Cliffs, New Jersey.
6. Oliver, J. E., and Hidore J. J., (2002): *Climatology: An Atmospheric Science*, Pearson Education, New Delhi.
7. Singh, S., (2009): *Jalvayu Vigyan (Hindi),*, Prayag Pustak Bhawan, Allahabad
8. Strahler, A.N., (1987) *Modern Physical Geography*, John Wiley and Sons, New York, Singapore.
9. Trewartha, G. T., and Horne L. H., (1980): *An Introduction to Climate*, McGraw-Hill.

Semester VI

Course name: Hydrology and Soil Study

Paper Code- C-14

Total Credit: 4

Course Objective

- Understand the basic components of the hydrological cycle and comprehend practices of integrated watershed management.
- Evaluate the water balancing and river basin, and water disputes.
- Study the soil as a basic resource, focusing on its distribution, problems, and management.

Course Outcome

- Understand the basic components of the hydrological cycle and learn best practices of integrated watershed management.
- Explain various components of water balance and management of river basins.
- Identify different types of soil, distribution, and management of soil resources.

Theory Credit 3

1. Hydrological Cycle: Systems approach in hydrology, human impact on the hydrologicalcycle; Precipitation, interception, evaporation, evapo-transpiration, infiltration, ground- water, runoff and overland flow;
2. Water Balance: input and output; water balance; floods and droughts; Integrated water resource management.
3. River Basin: Characteristics and problems of river basins, basin surface run-off, and measurement of river discharge. Watershed management
4. River Water Dispute; River linkages; Case studies
5. Soil Resource: Definition, Types and Distribution, Utilisation, Problems and Management of Soil Resource.

Practical Credit 1

1. Thematic mapping: River water dispute area in India
2. Quality assessment of soil (Organic matter and NPK) **OR** water (pH and Total Dissolved Solids) using field kit.
3. Viva voce and practical notebook

Reading List

1. Andrew. D. ward, and Stanley, Trimble., (2004): Environmental Hydrology, 2nd edition, Lewis Publishers, CRC Press.
2. Fetter, C.W. (2005):Applied Hydrogeology, CBS Publishers & Distributors, New Delhi.
3. Reddy, K. Ramamohan, Venkateswara Rao,B, Sarala, C., (2014):Hydrology and Watershed Management, Allied Publishers.
4. Karanth, K.R., (1988): Ground Water: Exploration, Assessment and Development, Tata-McGraw Hill, New Delhi.
5. Ramaswamy, C., (1985): Review of floods in India during the past 75 years: A Perspective, Indian National Science Academy, New Delhi.
6. Rao, K.L., (1982): India's Water Wealth, 2nd edition, Orient Longman, Delhi.
7. Singh, M., Singh, R.B. and Hassan, M.I., (Eds.) (2014):Landscape ecology and water management, Proceedings of IGU Rohtak Conference, Volume 2. Advances in Geographical and Environmental Studies, Springer.
8. Singh, Vijay P., (1995): Environmental Hydrology. Kluwar Academic Publications, The Netherlands.

Semester VI

Course Name: Evolution of Geographical Thought

Paper Code: C-15

Total Credits: 4

Course objectives

- This paper is a core paper that intends to introduce students to philosophical and methodological issues in the development of the discipline of geography.
- To assess the nature and trend of ancient, modern, and post-modern trends in the field of geography

Course outcomes

- The paper will be useful for students in understanding perspectives on the development and contemporary trends in geography and its systematic study.
- The paper will be useful for students preparing for UGC NET/SLET exams and other competitive exams including the civil services.

Theory Credit 3

1. Paradigms and Regional concepts:
    a) Geography as a science of planet earth;
    b) Geography as a science of distribution
    c) Regional Concept: Physical and cultural regions
2. Pre-Modern Period:
    a) Pre-classical period – Greeks and Romans (Eratosthenes and Strabo)
    b) Medieval period- Arabs (Al-Masudi)
    c) Age of exploration and discovery
    d) Classical Period- founders of modern geography: Alexander Von Humboldt, Carl Ritter.
3. Modern geography – Evolution of Geographical Thinking:
    a) France- Vidal de La Blache
    b) Germany- Friedrich Ratzel
4. Debates – a) Physical vs Human geography
    b) Environmental Determinism and Possibilism
    c) Systematic and Regional
5. Trends – a) Quantitative Revolution and its Impact
    b) Modern themes: Behaviouralism

Practical Credit 1

1. Mapping of routes of exploration and discoveries (Marco Polo, Christopher Columbus, Vasco-da Gama, and James Cook)
2. Prismatic compass survey (open and closed)
3. Viva voce and practical notebook.

Reading List

1. Arentsen M., Stam R. and Thuijis R., 2000: Post-modern Approaches to Space, ebook.
2. Bhat, L.S. (2009) Geography in India (Selected Themes). Pearson.
3. Dikshit R. D., 1997: Geographical Thought: A Contextual History of Ideas, Prentice– Hall India.
4. Hartshone R., 1959: Perspectives of Nature of Geography, Rand MacNally and Co.
5. Holt-Jensen A., 2011: Geography: History and Its Concepts: A Students Guide, SAGE.
6. Johnston R. J., (Ed.): Dictionary of Human Geography, Routledge.
7. Kapur A., 2001: Indian Geography Voice of Concern, Concept Publications.
8. Martin Geoffrey J., 2005: All Possible Worlds: A History of Geographical Ideas, Oxford.
9. Soja, Edward 1989. Post-modern Geographies, Verso, London. Reprinted 1997: Rawat Publ., Jaipur and New Delhi.

Semester VII

Course Name: Disaster Management
Paper Code: C-16(A)
Total Credits: 4

Course Objective

- To impart knowledge on different types of disasters to the students
- To provide practical knowledge in the field on the causes and impacts of disasters occurring in time and over space.
- To make the students learn about the disaster-specific management strategies to be adopted to reduce loss and damages.

Course Outcomes

- The students will experience the ground reality of the destructive damage of disasters in the field.
- The students with their experience may extend all possible help and cooperation the victims as well as authorities engaged in disaster management.
- The students will gain practical experience in the entire process of disaster management through their project work assigned on a specific problem.

Theory **Credit 3**

1. Disaster –definition and concepts: hazards disaster-risk and vulnerability.
2. Classification of Disaster: Manmade and Natural Disasters.
3. Disasters in India – Flood, landslide, earthquake and cyclone (causes, impact distribution and mapping).
4. Human induced disaster: Fire hazard, chemical, industrial accidents.
5. Responses and mitigation to disaster: Mitigation and preparedness, NDMA and NDIM; Indigenous Knowledge and Community Based Disaster management; Do's and Don'ts During and Post Disasters.

Practical **Credit 1**

1. Surveying: Plane Table, Chain and tape.
2. Surveying: determination of height using theodolite.

Reading List

1. Kapur, A. (2010). Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.
2. Modh, S. (2010) Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan, Delhi.
3. Singh, R. B. (ed.), (2006) Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi.
4. Stoltman, J.P. et al. (2004) International Perspectives on Natural Disasters, Kluwer Academic Publications. Dordrecht.
5. Singh Jagbir (2007) "Disaster Management Future Challenges and Opportunities", 2007. Publisher- I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).

Semester VII

Course Name: Geography of Health
Paper Code: C16(B)
Total Credits: 4

Course objectives

- Understand the key concepts related to health and its driving forces
- Identify the linkages between the health, environment, exposure and risk.
- Explain the relationships among health and disease pattern in environmental context concerning climate change

Course Outcomes

- Understand health issues in its spatial context and the influence of place and location on human health.
- Analyze spatial patterns of disease and health care provisions.
- Apply geographical concepts and techniques to health-related problems
- Apply geographical knowledge to health policy advocacy specifically to third world diseases.

Theory **Credit 3**

1. Perspectives on Health: Definition; linkages with environment, development and health; driving forces in health and environmental trends - population dynamics, urbanization, poverty and inequality.
2. Pressure on Environmental Quality and Health: Human activities and environmental pressure land use and agricultural development; industrialization; transport and energy.
3. Exposure and Health Risks: Air and water pollution; household wastes; housing;workplace.
4. Health and Disease Pattern in Environmental Context with special reference to India, Types of Diseases and their regional pattern (Communicable and Lifestyle related diseases).
5. Climate Change and Human Health: Changes in climate system – heat and cold; Biological disease agents; food production and nutrition.

Practical **Credit 1**

1. Identify and interpret the quality of life: health sector, water, education.
2. Identification of water pollution
3. Viva voce and practical notebook.

Reading List

1. Rais, Akhtar., (Ed.), (1990): Environment and Health Themes in MedicalGeography, Ashish Publishing House, New Delhi.
2. Avon, Joan, L. and Jonathan, A, Patzed (2001): Ecosystem Changes and Public Health,Baltimin, John Hopling Unit Press(ed).
3. Bradley,D.,(1977): Water, Wastes and Health in Hot Climates, John WileyChichesten.
4. Cliff, A.D. and Peter,H., (1988): Atlas of Disease Distributions, BlackwellPublishers, Oxford.
5. Gatrell, A. andLoytonen, (1998): GIS and Health, Taylor and Francis Ltd, London.
6. Hazra, J., (1997): Health Care Planning in Developing Countries. University of Calcutta,Calcutta.
7. Moeller, Dade, wed., (1993): Environmental Health, Cambridge, Harward Univ.Press.
8. Narayan, K.V., (1997): Health and Development Inter-Sectoral Linkages in India.Rawat Publications, Jaipur.

Semester VII

Course Name: Statistical Methods in Geography
Paper Code: C 17
Total Credits: 4

Course objectives

- The paper Statistical Methods in Geography throws light on the importance of data in geography.
- It deals with the methods and techniques of data collection, data tabulation, data interpretation, and analysis.
- This paper provides an understanding of the pure and applied nature of Geography along with the key elements in the discipline.

Course Outcomes

- To comprehend fundamental statistical concepts, such as probability and regression.
- Understand the principles of spatial data analysis
- Apply statistical methods to analyze and interpret geographic data

Theory **Credit 3**

1. Importance and significance of statistics in Geography
2. Sources of Geographical data for statistical analysis
3. Sampling: Need and types; Significance and methods of random sampling.
4. Theoretical distribution: Frequency, Cumulative frequency, normal and probability.
5. Measures of dispersion- range, mean deviation, standard deviation, coefficient of variation.

Practical **Credit 1**

1. Measures of Central Tendency (Mean, Median and Mode);Measures of Dispersion (Quartile deviation); Time series analysis of Temporal data.
2. Correlation (Karl Pearson method) and regression analysis.
3. Viva voce and practical note book

Reading List

1. Berry B. J. L. and Marble D. F. (eds.): Spatial Analysis – A Reader in Geography.
2. Ebdon D., 1977: Statistics in Geography: A Practical Approach.
3. Gragory,S., :1963: Statistical
4. Hammond P. and McCullagh P. S., 1978: Quantitative Techniques in Geography: An Introduction, Oxford University Press.
5. King L. S., 1969: Statistical Analysis in Geography, Prentice-Hall.
6. Mahmood A., 1977: Statistical Methods in Geographical Studies, Concept.

Semester VII

Course Name: Urban Geography

Paper Code: C 18

Total Credits: 4

Course objectives

- This paper introduces students to the field of urban geography and its specificities
- It seeks to develop new insights among students on the relevance of an urban economy and geography and associated problems in a rapidly urbanizing world.

Course Outcomes

- The paper will be useful for students in developing ideas on how geographical factors organize urban spaces and how geographers seek to address city-specific problems and issues.
- It will build skills for students seeking to enroll in a research program and/or provide openings for them with urban/city planning agencies.

Theory — Credit 3

1. Urban geography: Introduction, nature and scope.
2. Patterns of Urbanization in developed and developing countries.
3. Functional classification of towns; Models in Urban studies (Concentric Zone Model, Multiple Nuclei model)
4. Urban Issues: problems of housing, slums, civic amenities (water and transport)
5. Case studies of Delhi and Chandigarh with reference to Land use and Urban Issues.

Practical — Credit 1

1. Map showing the distribution of class I and II urban centres in NE India by using the proportionate sphere method.
2. Calculation of distribution pattern of urban settlements in a District/State of N.E. India using Nearest Neighbor Analysis.
3. Viva voce and practical notebook.

Reading List

1. Fyfe N. R. and Kenny J. T., 2005: The Urban Geography Reader, Routledge.
2. Graham S. and Marvin S., 2001: Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition, Routledge.
3. Hall T., 2006: Urban Geography, Taylor and Francis.
4. Kaplan D. H., Wheeler J. O. and Holloway S. R., 2008: Urban Geography, John Wiley.
5. Ramachandran R (1989): Urbanisation and Urban Systems of India, Oxford University Press, New Delhi
6. Ramachandran, R., 1992: The Study of Urbanisation, Oxford University Press, Delhi
7. Singh, R.B. (Eds.) (2001) Urban Sustainability in the Context of Global Change, Science Pub., Inc., Enfield (NH), USA and Oxford & IBH Pub., New Delhi.
8. Singh, R.B. (Ed.) (2015) Urban development, challenges, risks andresilience in Asian megacities Advances in Geographical and Environmental Studies, Springer

Semester VII
Course Name: Research Methodology
Paper Code: C-19
Total Credits: 4

Objective: The objective of this course is to introduce students to the fundamentals of research methodology, emphasizing the processes, techniques, and tools required to conduct high-quality research. Students will learn about the various types of research, including qualitative, quantitative, and experimental approaches, and the importance of designing research with clear objectives, hypotheses, and problem statements. The course will cover the practical aspects of research design, data collection, and sampling techniques. Students will also explore the process of data analysis using statistical methods and software, along with ethical considerations and report writing standards, including the use of referencing styles and plagiarism detection tools.

C-19 (T) BCC 19: (Theory 60 lectures)

Unit 1: Research Methodology (15 Lectures)
Objectives and motivations in research; Characteristics and limitations of research; Components of research work; Criteria of good research, Research process; Types of Research; Fundamental, Pure or Theoretical Research, Applied Research, Descriptive Research, Evaluation Research, Experimental Research, Survey Research, Qualitative Research, Quantitative Research.

UNIT 2: Research Design Formulation (15 Lectures)
Research Design – definition – essentials and types of research design – errors and types of errors in research design. Research problem: Selecting and analyzing the research problem – problem statement formulation – formulation of hypothesis. Variables in Research – Measurement and scaling, Different scales, Construction of instrument, Validity and Reliability of instrument.

UNIT 3: Research Publication Ethics (15 Lectures)
Publication Ethics: Definition, Introduction and Importance, Conflicts of Interest, Best practices/standards initiatives, and guidelines: COPE, EAME, etc. Plagiarism, Self-Plagiarism, Software for detection of Plagiarism. Publication misconduct: definition, concept, problems that lead to unethical behavior and vice-versa, types, complaints and appeals.

UNIT 4: Code of Ethics in Research (15 Lectures)
Ethical issues in research: Code of Ethics in Research, Violation of publication ethics, authorship and contributor ship, Intellectual Property Rights, Ethics related to Participants and Researchers: Copyright; Royalty, Patent Law, Citation, Acknowledgment. Predatory publishers and journals

Recommended Books:
1. Pagadala Suganda Devi, Research Methodology: A Handbook for Beginners, 2017.
2. S. Sachdeva, Research Methodology, 2020.
3. Shanti Bhushan Mishra, A Handbook on Research Methodology, 2017.
4. C. Neal Stewart Jr., Research Ethics for Scientists: A Companion for Students.
5. Ana S. Iltis (ed.), Douglas MacKay (ed.), The Oxford Handbook of Research Ethics, 2024.
6. Paul Oliver, The Students' Guide to Research Ethics, 2003.

Semester VIII

Course Name: Sustainable Development

Paper Code: C-20

Total Credits: 4

Course objectives

- The paper highlights on the basics of sustainability, including the Millennium Development Goals.
- It also focuses on sustainable and inclusive development, along with environmental management.
- Sustainable development policies and programmes, including the principles of good governance, are also discussed in the paper.

Course outcomes

- Understand the concept of sustainability, sustainable development and inclusive development;
- Knowledge of sustainable development policies and programmes;
- Deeper knowledge of the national environmental policy, and the principles of good governance.

Theory **Credits 3**

1. Sustainable Development: Definition, Components, Limitations and Historical Background.
2. The Millennium Development Goals: National Strategies and International Experiences
3. Sustainable Regional Development: Need and examples from different Ecosystems.
4. Inclusive Development: Education, Health; Climate Change: The role of higher education in sustainable development; The human right to health; Poverty and disease.
5. Sustainable Development Policies and Programmes.

Practical **Credits 1**

1. Project report based on any one field-based case study among the following:
    a) Health issues in any local village
    b) Education status in any local village
2. Practical Record
    a) Each student will prepare an individual report based on primary and secondary data collected during field work.
    b) The report should include figures, tables, photographs, maps, references and appendices.
    c) One typed copy of the report on A4 size paper should be submitted.

Reading List

1. Agyeman, Julian, Robert D. Bullard and Bob Evans (Eds.) (2003) Just Sustainabilities: Development in an Unequal World. London: Earth scan. (Introduction and conclusion.).
2. Ayers, Jessica and David Dodman (2010) "Climate change adaptation and development I: the state of the debate". Progress in Development Studies 10 (2): 161-168.
3. Baker, Susan (2006) Sustainable Development. Milton Park, Abingdon, Oxon; New York, N.Y.: Routledge. (Chapter 2, "The concept of sustainable development").
4. Brosius, Peter (1997) "Endangered forest, endangered people: Environmentalist representations of indigenous knowledge", Human Ecology 25: 47-69.
5. Lohman, Larry (2003) "Re-imagining the population debate". Corner House Briefing 28.
6. Martínez-Alier, Joan et al (2010) "Sustainable de-growth: Mapping the context, criticisms and future prospects of an emergent paradigm" Ecological Economics 69: 1741-1747.
7. Osorio, Leonardo et al (2005) "Debates on sustainable development: towards a holistic view of reality". Environment, Development and Sustainability 7: 501-518.
8. Robbins, Paul (2004) Political Ecology: A Critical Introduction. Blackwell Publishing.
9. Singh, R.B. (Eds.) (2001) Urban Sustainability in the Context of Global Change, Science Pub., Inc., Enfield (NH), USA and Oxford & IBH Pub., New Delhi.

Semester VIII

Course Name: Biogeography

Paper Code: C-21

Total Credits: 4

Course objectives

- To introduce the student to the concept of Biogeography.
- Information and its application; interactions between living organisms with climate and physical environment, with special reference to India.

Course outcomes

- To understand how species are distributed across the globe and how those patterns change over time.
- To address issues related to biogeography and invasive species management.
- Identify and explain the characteristics of different biomes.

Theory **Credits 3**

1. Biogeography - Concept, definition, nature and scope; Historical Development and Branches of Biogeography; Approaches in Biogeography; Importance of Biogeographic Studies
2. Ecosystem: Concept, meaning and types; Components of ecosystem and ecosystem productivity; Biosphere: Concept, meaning and components; Biogeographic processes
3. Global distribution of flora (Phytogeography) and fauna (Zoogeography) and its relation to vegetation types, climate and human activities.
4. Biogeographic Zones and Biomes: World climatic zones and their corresponding biomes- Tundra, forests, deserts, grasslands.
5. Human Impact on Biogeography: Deforestation and its consequences, social forestry and agroforestry. National Forest and Wildlife Policy of India.

Practical **Credits 1**

1. Interpret satellite imagery or aerial photographs to identify land cover types.
2. A case study to analyse the impact of invasive species on native ecosystems.
3. Viva voce and practical notebook.

Reading List

1. Agrawal, D.P.: Man and Environment in India Through Ages, Book & Books, 1992.
2. Gaur, R.: Environment and Ecology of Early Man in Northern India, R.B, Publication Corporation, 1987.
3. Huggett. R.J.: Fundamentals of Biogeography. Routledge, U.S.A, 1998.
4. IIIies, J.: Introduction to Zoogeography, Mcmillan, London, 1974.
5. Mathur, H.S.: Essentials of Biogeography, Anuj Printers, Jaipur, 1998.
6. Pears, N.: Basic Biogeography, 2nd edn. Longman, London, 1985.
7. Tivy, J.: Biogeography: A Study of Plants in Ecosphere 3rd edn. Oliver and Boyd, U.S.A., 1992
8. Lowe, Joseph John;Walker, Mike J C. “Reconstructing Quaternary Environments”. Taylor and Francis; Routledge. 2015.
9. Khadilkar, Jagadish. “Antarctica: The Frozen Continent's Environment, Changing Logistics and Relevance to India”. 2017. Bloomsbury Publishing India Pvt. Ltd. ISBN: 9789386643001.
10. Singhvi, A.K. and Kale S. Vishwas. “Paleoclimate Studies in India: Last Ice Age to the Present”. Indian National Science Academy. IGBP-WCRP-SCOPE- Report Series:4. https://www.insaindia.res.in/pdf/Paleoclimate-Final_18-12 09-web.pdf.

Semester VIII
Course Name: Advanced Geomorphology
Paper Code: C-22
Total Credits: 4

Course Objectives:

- To familiarize the students with the need for understanding geomorphology with reference to certain fundamental concepts.
- To acquaint students with the current and modern trends geomorphology
- Applications of geomorphology to societal needs and environmental quality.

Course Outcomes:

- Understand the key concepts and theoretical frameworks**.**
- Understand the relationship between geomorphic processes and the resulting landforms
- Understand the geomorphic characteristics of specific regions or landscapes.

Theory **Credits 3**

1. Nature, Scope and Modern trends in Geomorphology; Fundamental concepts in Geomorphology-Concept of time: cyclic, graded and steady state; Concept of morphogenetic region; Concept of dynamic equilibrium.
2. Geological structures of the Earth, seismicity, volcanicity, isostasy, continental drift, sea floor spreading, plate tectonics, and mountain building with reference to the Himalayas.
3. Fluvial process and landforms; drainage pattern and channel morphology; glacial, periglacial, and paraglacial processes and landform evolution; work of ocean and coastal landforms; weathering and mass movement,
4. Climatic Geomorphology- Geomorphic processes and Climatic controls (Direct and Indirect): Morphogenetic Regions- Peltier's Classification; Tricart and Cailleux classification
5. Meaning, Concept and emergence of Applied Geomorphology. Application of Geomorphology in Indian Context, Regional Planning, Hazard Management, Urbanization and Mineral Exploration.

Practical **Credits 1**

1. Topographic Profiling (Simple, superimposed, composite, and projected profiles)
2. Morphometric analysis of drainage basin: Relative Relief Map, Drainage Density map, Drainage pattern diagrams.
3. Viva voce and practical notebook.

Reading List

1. Chorley, R.J.: Spatial Analysis in Geomorphology, Methuen, London, 1972.
2. Fairbridge, R.W. Encyclopedia of Geomorphology, Reinholdts, New York, 1968
3. Goudie, A.: The Nature of the Environment, Oxford & Blackwell, London, 1993.
4. Garner, H.F.: The Origin of Landscapes- A Systematic of Geomorphology, Oxford University Press, London.1975.
5. Pitty, A.F. Introduction to Geomorphology, Methuen, London, 1971.
6. Stoddart, D.R. (e.d.): Process and form in Geomorphology, Routledge, New York, 1996.
7. Sparks, B.W. Geomorphology, Longman, 1960. 1
8. Sharma, H.S.(e.d.): Perspectives in Geomorphology, Concept, New Delhi,1980.
9. Singh,S.: Geomorphology, Prayag Publication,Allahabad,1988. 1
10. Thornbury, W.D. Principles of Geomorphology, John Wiley,New York,1960.
11. S., Kale Vishwas, Introduction to Geomorphology. Orient Longman, 2001.
12. Sharma, K. et al., (eds.) Geomorphology and Environmental Sustainability. Concept N. Delhi.
13. Sharma, H.S.: Environmental Geomorphology. Concept Publishing Co. New Delhi.

Semester VIII

Course Name: Fundamentals of Geospatial Science
Paper Code: C 23
Total Credits: 4

Course objectives

- To introduce students to the interface of Remote Sensing, GIS and GPS.
- To develop new insights among students on the relevance of geospatial studies within the field of geography.

Course outcomes

- To develop skills in spatial data analysis if they wish to pursue a research programme or seek a career in Geospatial science.
- The paper will be beneficial for students preparing for various competitive examinations.

Theory **Credits 3**

1. Introduction to Geospatial Science: History and applications; Key components (GIS, Remote Sensing and GPS), Spatial vs. non-spatial data.
2. Geospatial Data & Coordinate Systems: Data types (vector and raster); Coordinate systems (geographic vs. projected), datums, and map projections.
3. Remote Sensing Basics: Definition and Principles of Remote Sensing, Components, Electromagnetic Spectrum, Platforms, and Sensor Types.
4. Global Navigation Satellite Systems (GNSS): How GPS works (satellites, receivers, trilateration), Differential GPS (DGPS) and accuracy, GPS data integration.
5. Application of Remote Sensing and GIS: Land use/ Land Cover, Urban Sprawl Analysis; Forests Monitoring.

Practical **Credits 1**

1. Georeferencing and digitization.
2. Image interpretation and Classification (Supervised & Unsupervised).
3. Viva-voce and practical note book.

Reading List

1. Bhatta, B. (2020). *Remote sensing and GIS* (Third edition). Oxford University Press.
2. Bhunia, G. S., Chatterjee, U., Panda, G. K., & Shit, P. K. (2022). *Remote sensing and GIS in natural resource management*. Rawat Publications.
3. Campbell J.B., 2007: *Introduction to Remote Sensing*, Guildford Press.
4. Dadhwal, V. K., & Kumar, S. (2018). George Joseph and C. Jeganathan: *Fundamentals of Remote Sensing* Third Edition, Universities Press Pvt. Ltd.
5. Jensen J.R., 2004: *Introductory Digital Image Processing: A Remote Sensing Perspective*, Prentice Hall.
6. Joseph, G. 2005: *Fundamentals of Remote Sensing*, United Press India.
7. Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2015). *Remote sensing and image interpretation* (Seventh edition). John Wiley & Sons, Inc.
8. Maltiar, K. K., & Maltiar, S. R. (2017). *Concepts of cartography, remote sensing and GIS*. Rajesh Publications.
9. Nag P. and Kudra, M., 1998: *Digital Remote Sensing*, Concept, New Delhi.
10. Reddy, A. M. (2002). *Textbook of remote sensing and geographical information system* (4th ed). BS Publications.
11. Sahu, K. C. (2008). *Textbook of remote sensing and geographical information system*. Atlantic.
12. Sarkar, A. (2015) *Practical geography: A systematic approach*. Orient Black Swan Private Ltd., New Delhi.
13. Singh R. B. and Murai S., 1998: *Space-informatics for Sustainable Development*, Oxford and IBH Pub.
14. Wolf P. R. and Dewitt B.A., 2000: *Elements of Photogrammetry: With Applications in GIS*, McGraw-Hill.

Skill Enhancement Course (SEC)

Course Name: Thematic Maps
Paper Code: S1
Total credits: 3

Course objective

- To understand the fundamental principles of map design and types of maps.
- To study the thematic mapping techniques.
- To familiarize the students with the principles of cartographic design.

Course outcomes

- General understanding of map characteristics and map design.
- Understanding the techniques of preparing different thematic maps

Course content

1. Maps – Classification and Types; Principles of Map Design.
2. Diagrammatic Data Presentation – Line, Bar and Circle.
3. Thematic Mapping Techniques – Properties, Uses and Limitations; Areal Data- Choropleth, Dot, Proportional Circles; Point Data – Isopleths.
4. Cartographic Overlays – Point, Line and Areal Data.

Reading list

1. Singh, R. L, and Duttta, P. K., (2012): *Prayogatama Bhugol*, Central Book Depot, Allahabad
2. Cuff, J. D. and Mattson, M. T., (1982): *Thematic Maps: Their Design and Production*, Methuen Young Books
3. Dent, B. D., Torguson, J. S., and Holder, T. W., (2008): *Cartography: Thematic Map Design* (6th Edition), McGraw Hill Higher Education
4. Gupta, K. K. and Tyagi, V. C., (1992): *Working with Maps*, Survey of India, DST, New Delhi.
5. Kraak, M.J. and Ormeling, F., (2003): *Cartography: Visualization of Geo-Spatial Data*, Prentice-Hall.

Course Name: Remote Sensing
Paper Code: S3
Total credits: 3

Course objective

- To introduce students to the interface of Remote Sensing.
- To develop new insights among students on the relevance of geospatial studies within the field of geography.

Course outcomes

- The paper remains useful for students in developing skills in spatial data analysis if they wish to pursue a research programme.
- The students will be equipped with the application of remote sensing in various fields.

Course content

1. Remote Sensing: Definition, Development; Platforms and Types
2. Aerial Photography and Satellite Remote Sensing: Principles, Types and Geometry of Aerial Photograph; EMR Interaction with Atmosphere and Earth Surface; Satellites – geostationary and remote sensing (Landsat and IRS) and Sensors, Resolution (spatial and temporal).
3. Introduction to Image Processing and Data Analysis: Geo-Referencing; Editing and Output.
4. Application of Remote Sensing in Forests Monitoring, Water Resources and Natural hazards.

Reading List

1. Campbell J.B., 2007: Introduction to Remote Sensing, Guildford Press.
2. Jensen J.R., 2004: Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice Hall.
3. Joseph, G. 2005: Fundamentals of Remote Sensing, United Press India.
4. Lillesand T. M., Kiefer R. W. and Chipman, J. W., 2004: Remote Sensing and Image Interpretation, Wiley. (Wiley Student Edition).

Course Name: Geographical Information System
Paper Code: S4
Total credits: 3

Course objectives

- To introduce students to the interface of Geo-technological science and application.
- To develop new insights among students on the relevance of geospatial studies within the field of geography.

Course Outcomes

- Develop skills in spatial data analysis if they wish to pursue a research programme.
- The students will be equipped with the application of GIS in various fields.

Course content

1. GIS Data Structures: Types (spatial and Non-spatial)
2. Raster and Vector Data Structure.
3. Functions in GIS- Overlay function, rubber sheeting, big data .
4. Interpretation and Application of GIS: Land use/ Land Cover, Urban Sprawl Analysis, crime study.

Reading list

1. Anji Reddy, M. (2008): Textbook of Remote Sensing and Geographic Information System, B.S. Publication, Hyderabad
2. Nag P. and Kudra, M., 1998: Digital Remote Sensing, Concept, New Delhi.
3. Rees W.G., 2001: Physical Principles of Remote Sensing, Cambridge University Press.
4. Singh R. B. and Murai S., 1998: Space-informatics for Sustainable Development, Oxford and IBH Pub.
5. Campbell, J. B., (2007): Introduction to Remote Sensing, Guildford Press.