

UNIVERSITY OF KALYANI



Syllabus for Undergraduate Programmes in Geography

Semester: I - VIII

**Under Curriculum and Credit Framework for Undergraduate
Programmes (CCFUP) as per NEP, 2020**

With Effect from the Academic Session 2023-2024

PREAMBLE

The Undergraduate Board of Studies (UGBOS) in Geography, University of Kalyani, has redesigned the syllabus for Undergraduate Programmes in Geography under Curriculum and Credit Framework for Undergraduate Programmes (CCFUP) as per the New Education Policy (NEP), 2020, following the recommendations and guidelines of University Grants Commission (UGC) and University of Kalyani. The UGBOS in Geography has designed the current curriculum as inclusive, with specific course objectives, learning outcomes, professional skill development opportunities, and comprehensive course contents.

In alignment with the UGC's vision for the National Education Policy (NEP 2020), the primary objective of framing this new syllabus of Undergraduate Programmes in Geography is to provide students with a holistic understanding of the discipline. By giving substantial weightage to core content, skill development, and ability enhancement, the syllabus ensures students are well-equipped for both professional and academic excellence.

The syllabus aims to maintain balance by assigning equal weight to Physical and Human Geography, the two primary branches of the discipline, alongside both theoretical and practical courses. To meet the growing demands of the job market, the syllabus also prioritizes proficiency in geospatial technology, field survey, and data analysis. The primary goal of this syllabus is to provide students with in-depth knowledge of the subject and improve their career prospects and employability. Adequate attention has been devoted to emerging concepts, theories and techniques, as well as the understanding of the subject within a changing global context.

A course on "Honours with Research Students" has been introduced to offer specialised and advanced knowledge, and to foster interest, rigorous orientation, and skill development in research among Geography Honours students.

It is hoped that the present curriculum will make it more contextual, viable and suitable to cater the diverse needs of students of Geography in Undergraduate Programmes.

Undergraduate Board of Studies in Geography
University of Kalyani

**TOTAL CREDIT STRUCTURE: UNDERGRADUATE PROGRAMMES IN
GEOGRAPHY (AS PER NEP 2020)**

SEMESTER I - VIII								
Semester	Major (M)	Minor (MI)	Multidisciplinary Course (MU)	Ability Enhancement Course (AECC)	Skill Enhancement Course (SEC)	Value Added Course (VA)	Summer Course	Total Credit
UG Honours without Research	102+2	32	9	8	9	8	0	170
UG Honours with Research	90+2	32	9	8	9	8	12	170

**SEMESTER WISE COURSE STRUCTURE: UNDERGRADUATE PROGRAMMES
IN GEOGRAPHY (AS PER NEP 2020)**

SEMESTER I							
Course Code	Course Title	Nature of Course	Credit of Course	Class hour/week	Evaluation		Total Marks
					Internal	Semester End	
GEOG-M-T-1	GEOTECTONICS AND GEOMORPHOLOGY	Major	6	6	15	60	75
GEOG-MI-T-1	PHYSICAL GEOGRAPHY	Minor	4	4	10	40	50
GEOG-MU-T-1	DISASTER MANAGEMENT	Multidisciplinary Course	3	3	10	35	45
GEOG-SEC-P-1	BASICS OF COMPUTER AND COMPUTER APPLICATIONS	Skill Enhancement Course	3	3	10	35	45
GEOG-VA-T-1	-	Value Added Course	4	4	10	40	50
05			20	20	55	210	265

SEMESTER II							
Course Code	Course Title	Nature of Course	Credit of Course	Class hour/week	Evaluation		Total Marks
					Internal	Semester End	
GEOG-M-T-2	POPULATION AND SETTLEMENT GEOGRAPHY	Major	6	6	15	60	75
GEOG-MI-T-1	PHYSICAL GEOGRAPHY	Minor	4	4	10	40	50
GEOG-MU-T-1	DISASTER MANAGEMENT	Multidisciplinary Course	3	3	10	35	45
AECC-1	-	Ability Enhancement Course	4	4	10	40	50
GEOG-SEC-P-2	FIELD WORK	Skill Enhancement Course	3	3	10	35	45
GEOG-SI-T-1	-	Summer Internship	4	4	-	-	-
05			20	20	55	210	265

**SEMESTER WISE COURSE STRUCTURE: UNDERGRADUATE PROGRAMMES
IN GEOGRAPHY (AS PER NEP 2020)**

SEMESTER III							
Course Code	Course Title	Nature of Course	Credit of Course	Class hour/week	Evaluation		Total Marks
					Internal	Semester End	
GEOG-M-T-3	FUNDAMENTALS OF REMOTE SENSING, GIS AND GNSS	Major	6	6	15	60	75
GEOG-MI-T-2	HUMAN GEOGRAPHY	Minor	4	4	10	40	50
GEOG-MU-T-1	DISASTER MANAGEMENT	Multidisciplinary Course	3	3	10	35	45
GEOG-SEC-P-3	APPLICATIONS OF REMOTE SENSING AND GIS	Skill Enhancement Course	3	3	10	35	45
GEOG-VA-T-2	-	Value Added Course	4	4	10	40	50
05			20	20	55	210	265

SEMESTER IV							
Course Code	Course Title	Nature of Course	Credit of Course	Class hour/week	Evaluation		Total Marks
					Internal	Semester End	
GEOG-M-T-4	CLIMATOLOGY, SOIL AND BIOGEOGRAPHY	Major	6	6	15	60	75
GEOG-M-P-5	CARTOGRAPHIC TECHNIQUES AND SURVEYING	Major	6	6	15	60	75
GEOG-MI-T-2	HUMAN GEOGRAPHY	Minor	4	4	10	40	50
AECC-2	-	Ability Enhancement Course	4	4	10	40	50
GEOG-SI-T-2	-	Summer Internship	4	4	-	-	-
04			20	20	50	200	250

**SEMESTER WISE COURSE STRUCTURE: UNDERGRADUATE PROGRAMMES
IN GEOGRAPHY (AS PER NEP 2020)**

SEMESTER V							
Course Code	Course Title	Nature of Course	Credit of Course	Class hour/week	Evaluation		Total Marks
					Internal	Semester End	
GEOG-M-T-6	HYDROLOGY AND OCEANOGRAPHY	Major	6	6	15	60	75
GEOG-M-P-7	MAP PROJECTION, MAP INTERPRETATION AND IDENTIFICATION OF ROCKS AND MINERALS	Major	6	6	15	60	75
GEOG-MI-T-3	ECONOMIC GEOGRAPHY	Minor	4	4	10	40	50
-	-	Minor	4	4	10	40	50
04			20	20	50	200	250

SEMESTER VI							
Course Code	Course Title	Nature of Course	Credit of Course	Class hour/week	Evaluation		Total Marks
					Internal	Semester End	
GEOG-M-T-8	ECONOMIC GEOGRAPHY AND GEOGRAPHY OF INDIA	Major	6	6	15	60	75
GEOG-M-T-9	GEOGRAPHICAL THOUGHT	Major	6	6	15	60	75
GEOG-M-P-10	QUANTITATIVE TECHNIQUES IN GEOGRAPHY	Major	6	6	15	60	75
GEOG-M-P-11	-	(Outreach/ Internship)	2	2			
03			20	20	45	180	225

**SEMESTER WISE COURSE STRUCTURE: UNDERGRADUATE PROGRAMMES
IN GEOGRAPHY (AS PER NEP 2020)**

SEMESTER VII							
Course Code	Course Title	Nature of Course	Credit of Course	Class hour/week	Evaluation		Total Marks
					Internal	Semester End	
GEOG-M-T-12	GEOGRAPHY OF ENVIRONMENTAL ISSUES	Major	6	6	15	60	75
GEOG-M-T-13	SOCIAL AND CULTURAL GEOGRAPHY	Major	6	6	15	60	75
GEOG-M-P-14	ADVANCED REMOTE SENSING AND GIS	Major	6	6	15	60	75
GEOG-MI-T-4	GEOGRAPHY OF ENVIRONMENT	Minor	4	4	10	40	50
-	-	Minor	4	4	10	40	50
05			26	26	65	260	325

SEMESTER VIII							
Course Code	Course Title	Nature of Course	Credit of Course	Class hour/week	Evaluation		Total Marks
					Internal	Semester End	
GEOG-M-T-15	REGIONAL PLANNING AND DEVELOPMENT	Major	4	4	10	40	50
GEOG-M-T-16	RESEARCH METHODOLOGY	Major	4	4	10	40	50
GEOG-M-P-17	STATISTICAL TECHNIQUES USING SOFTWARE	Major	4	4	10	40	50
GEOG-M-T-18	POLITICAL GEOGRAPHY AND CONTEMPORARY ISSUES IN GEOPOLITICS	Major	6	6	15	60	75
GEOG-M-T-19	WELFARE GEOGRAPHY	Major	6	6	16	60	75
M-18 and M-19 for Honours without Research Students							
GEOG-SI-T-3	Research Project/ Dissertation	Summer Internship	12	12			150
SI-3 for Honours with Research Students							
05			24	24			300

SEMESTER I

Type: Major

PAPER: I (Theory)

COURSE CODE: GEOG-M-T-1

COURSE TITLE: GEOTECTONICS AND GEOMORPHOLOGY

Total Marks: 75

Credits: 6

Course Evaluation: Semester End Examination (60 Marks) and Internal Assessment (15 Marks)

Course Objectives:

- To understand the fundamental concepts in Geotectonics and Geomorphology
- To study the earth's interior, tectonic and structural evolution and earth's movements
- To explain the theories of continental drift, sea floor spreading and plate tectonics
- To study the diverse earth surface processes, landforms and their evolution

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- understand fundamental knowledge in Geotectonics and Geomorphology
- obtain adequate knowledge on the internal structure, tectonic and structural evolution of earth, concept of Isostasy and earth's movements
- acquire comprehensive knowledge of continental drift, sea floor spreading and plate tectonics theories
- understand the dynamic nature of the earth surface processes, landforms and their evolution

Professional Skill Development Opportunities of the Course:

The obtained fundamental knowledge and concept of this course will increase the interest of the learners for further study and research in Physical Geography and Earth Sciences. This course is also effective in developing observational skills and critical thinking abilities of the learners.

Course Content:

UNIT I: GEOTECTONICS

1. Earth's tectonic and structural evolution with reference to geological time scale
2. Earth's crust and interior: Internal structure with reference to seismological evidences
3. Theories of Isostasy: Airy and Pratt
4. Continental drift theory: Evidences and criticism; Concept of Sea Floor Spreading and Palaeomagnetism
5. Plate Tectonics: Mechanism and resultant landforms; Earthquakes and Vulcanicity
6. Folds and Faults: Origin and classification

UNIT II: GEOMORPHOLOGY

1. Fundamental principles of Geomorphology
2. Degradation processes: Weathering, Mass wasting and resultant landforms
3. Theories of landscape evolution: Davis, Penck and Hack
4. Slope development: Theories of King and Wood
5. Development of river network and landforms on uniclinal and folded structures
6. Processes and landforms: Fluvial, Glacial, Aeolian and Coastal

Suggested Readings:

- Bloom, A.L., (1998). *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*, 3rd edition, Prentice Hall of India, New Delhi.
- Bridges, E. M., (1990). *World Geomorphology*, Cambridge University Press, Cambridge.
- Chorley, R.J. and Kennedy, B.A., (1971). *Physical Geography: A Systems Approach*, Prentice Hall, Upper Saddle River, New Jersey
- Condie, K.C. (2003). *Plate Tectonics and Crustal Evolution*, Butterworth-Heinemann, Oxford, Burlington
- Duff, D., (1993). *Holmes' Principles of Physical Geology*, Stanley Thorne, Cheltenham
- Erickson, J., (2001). *Plate Tectonics: Unravelling the Mysteries of the Earth*, Checkmark Books, New York
- Goudie, A.S. and Viles, H., (2010). *Landscapes and Geomorphology: A Very Short Introduction*, Oxford University Press, Oxford
- Holmes, A., (1978). *Principles of Physical Geology*, Van Nostrand Reinhold, New York
- Huggett, R.J., (2011). *Fundamentals of Geomorphology*, Routledge, New York
- Kale, V.S. and Gupta, A., (2001). *Introduction to Geomorphology*, Orient Longman, Kolkata
- Keary, P. and Vine, M., (1997). *Global Tectonics*, Blackwell Scientific Publications, Oxford
- Ollier, C.D., (1981). *Tectonics and Landforms*, Longman Group Ltd., London
- Selby, M.J., (1985). *Earth's Changing Surface: An Introduction to Geomorphology*, Clarendon Press, Oxford
- Siddhartha, K., (2001). *The Earth's Dynamic Surface*, Kishalaya Publications, New Delhi
- Singh, S., (2000). *Geomorphology*, Prayag Pustak Bhavan, Allahabad
- Strahler, A.H. and Strahler A.N., (1992). *Modern Physical Geography*, John Wiley & Sons, New York
- Summerfield, M.A., (1991). *Global Geomorphology: An Introduction to the Study of Landforms*, Longman, London
- Summerfield, M.A., (ed.) (2000). *Geomorphology and Global Tectonics*, Wiley, Chichester
- Thorn, C., (1988). *Introduction to Theoretical Geomorphology*, Unwin Hyman, Boston
- Thornbury, W. D., (1960). *Principles of Geomorphology*, John Wiley & Sons, New York
- Wooldridge, S.W. and Morgan, R.S., (1937). *An Outline of Geomorphology: The Physical Basis of Geography*, Longman, London
- Young, A., (1972). *Slopes*, Oliver and Boyd, Edinburgh

SEMESTER I

Type: Minor

PAPER: I (Theory)

COURSE CODE: GEOG-MI-T-1

COURSE TITLE: PHYSICAL GEOGRAPHY

Total Marks: 50

Credits: 4

Course Evaluation: Semester End Examination (40 Marks) and Internal Assessment (10 Marks)

Course Objectives:

- To obtain fundamental knowledge of Physical Geography
- To study continental drift and plate tectonics theories
- To study the earth surface processes, landforms and their evolution
- To understand the basic ideas of atmosphere
- To study the basic ideas of soil and biome.

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- understand fundamental knowledge in Physical Geography
- obtain knowledge on the earth's interior, theories of continental drift and plate tectonics
- understand fundamental knowledge of the earth surface processes, landforms and their evolution
- acquire basic knowledge of atmosphere
- obtain basic ideas of hydrological cycle, soil and biome

Professional Skill Development Opportunities of the Course:

The obtained knowledge of this course will increase the interest of the learners for further study in Physical Geography particularly in the fields of Geotectonics, Geomorphology, Soil Geography and Biogeography. This course will help the learners in developing analytical skills, observational skills and critical thinking abilities.

Course Content:

1. Internal structure of the earth
2. Continental drift theory: Mechanism, evidences and criticisms
3. Plate tectonics: Mechanism and resultant landforms
4. Geomorphic process: Weathering
5. Processes and landforms: Fluvial, Glacial, Aeolian and Coastal
6. Composition and structure of the atmosphere
7. Insolation, Heat budget, Horizontal and vertical distribution of temperature
8. Hydrological cycle
9. Definition of soil, concept of soil profile and soil forming factors; Types of soil: Zonal, Azonal and Intrazonal
10. Concept of ecology and ecosystem; Biome: Tropical rain forest and Taiga

Suggested Readings:

- Barry, R. G, Chorley R. J., (2009). Atmosphere Weather and Climate. 9th Ed, Routledge.
- Biswas, T.D., and Mukherjee, S.K., (1997). Textbook of Soil Science. Tata McGraw Hill, New Delhi.
- Brady, N.C. and Weil, R.R., (1996). The Nature and Properties of Soil, 11th edition, Longman, London
- Chapman, J.L. and Rens, M.J.,(1993). Ecology: Principle and Applications. Cambridge University Press,
- Conserva H. T., (2004). Illustrated Dictionary of Physical Geography, Author House, USA.
- Critchfield, H. J., (1987). General Climatology, Prentice-Hall of India, New Delhi.
- Daji, J. A., Kadam, J.R., Patil, N.D. 1996 A Textbook of Soil Science, Media Promoters and Publishers Pvt Ltd.
- Garrett N., (2000). Advanced Geography, Oxford University Press.
- Goudie, A., (1984). The Nature of the Environment: An Advanced Physical Geography, Basil Blackwell Publishers, Oxford.
- Huggett, R., (1998). Fundamentals of Biogeography, Routledge, London
- Kormondy, E.J., (1996). Concept of Ecology, 4th edition, Prentice-Hall, New Delhi.
- Husain M., (2002). Fundamentals of Physical Geography, Rawat Publications, and Jaipur.
- Lal, D. S., (2012). Climatology. Sharda Pustak Bhawan.
- Monkhouse, F.J.,(2009). Principles of Physical Geography, Platinum Publishers, Kolkata.
- Strahler A.N. and Strahler A.H., (2008). Modern Physical Geography, John Wiley & Sons, New York.
- Trewartha, G. T. and Horne L. H., (1980). An Introduction to Climate, 5th edition, McGraw Hill Higher Education, New York

SEMESTER I

Type: Multidisciplinary Course

PAPER: I (Theory)

COURSE CODE: GEOG-MU-T-1

COURSE TITLE: DISASTER MANAGEMENT

Total Marks: 45

Credits: 3

Course Evaluation: Semester End Examination (35 Marks) and Internal Assessment (10 Marks)

Course Objectives:

- To acquire knowledge about basic concepts of disaster management
- To study the major natural and manmade disasters in India
- To learn disaster management strategies

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- learn the basic concepts in disaster management.
- understand the nature of natural and manmade disasters in India
- develop strategies for disaster management to sustain social development

Professional Skill Development Opportunities of the Course:

This course will help the learners in developing problem solving skills and observational skills. The acquired knowledge from this course will help the learners to develop effective strategies for management of disasters.

Course Content:

1. Definition and Concepts: Hazards, Disasters; Risk and Vulnerability; Classification of hazards
2. Flood, drought, landslide: causes, impact and distribution in India
3. Earthquake: causes, effects and seismic zones of India; Tsunami: causes and effects
4. Tropical Cyclone: structure, formation and impact with reference to India
5. Manmade disasters in India: soil erosion and accidental release of toxic chemicals – causes and impact
6. Disasters - response and mitigation measures: Institutional set up - NDMA and NIDM; Indigenous knowledge and community-based Disaster Management; Do's and Don'ts during and post disasters

Suggested Readings:

- Alexander, D., (1993). Natural Disasters, ULC Press Ltd., London.
- Collins, L.R., and Schneid, T.D., (2000). Disaster Management and Preparedness, Taylor and Francis, Florida.
- Edwards, B., (2005). Natural Hazards, Cambridge University Press, Cambridge.
- Gupta, H.K., (2010). Disaster Management, Universities Press India, Hyderabad.
- Kapur, A., (2010). Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.
- Modh, S., (2010). Managing Natural Disaster: Hydrological, Marine and Geological Disasters. Macmillan, New Delhi.
- Singh, J., (2007). Disaster Management, Future Challenges and Opportunities, I.K. International Pvt. Ltd., New Delhi.
- Singh, R.B., (2005). Risk Assessment and Vulnerability Analysis, IGNOU, New Delhi.
- Singh, R.B., (2006). Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, Jaipur.
- Sinha, A., (2001). Disaster Management: Lessons Drawn and Strategies for Future, New United Press, New Delhi
- Smith, K., (2011). Natural Hazards, Routledge, London
- Stoltman, J.P. et al., (2004). International Perspectives on Natural Disasters, Kluwer Academic Publications, Dordrecht.

SEMESTER I

Type: Skill Enhancement Course (SEC)

PAPER: I (Practical)

CODE: GEOG-SEC-P-1

COURSE TITLE: BASICS OF COMPUTER AND COMPUTER APPLICATIONS

Total Marks: 45

Credits: 3

Course Evaluation: Semester End Examination (25+10* = 35 Marks) and Internal Assessment (10 Marks)

***Laboratory Note Book + Viva-voce: 5+5 = 10**

Course Objectives:

- To understand the basics of computer and computer applications
- To develop knowledge about the binary arithmetic numbering systems
- To develop ability and skills in data computation, storing, formatting, analysis and cartographic presentation
- To develop internet surfing skills

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- gain knowledge of computer basics
- develop their ability and skills in data management, data computation, data analysis and cartographic presentation
- acquire internet surfing skills and enhance their ability to gain knowledge from the digital world

Professional Skill Development Opportunities of the Course:

This course has the great potential to advance the learner's career. This course is highly effective to develop data analysis skills, observation skills, communications skills in particular and digital skills in general. This course has a wide scope of employment opportunity.

Course Content

1. Basics of computer and its operation
2. Numbering Systems - Binary arithmetic
3. Preparation of Annotated diagrams and its interpretation: Line graph, Bar and Pie diagrams, Histogram and Scatter diagrams
4. Data computation, Storing and Formatting in Spreadsheets: Computation of Rank, Mean, Median, Mode, Standard Deviation, Moving Averages, Derivation of Correlation, Coefficient of Variation, Regression
5. Internet surfing: Generation and extraction of information

***A Project File of exercises consisting of each theme is to be submitted**

Suggested Readings:

- Bartee, T. C., (1977). Digital Computer Fundamental; McGraw Hill
- Blissmer, (1996). Working with MS Word; Houghton Mifflin Co.
- Chauhan, S., Chauhan, A., and Gupta, K., (2006). Fundamental of Computer; Firewall Media
- Flake, L. J., McClintock, C. E., and Turner, S., (1989). Fundamental of Computer Education; Wordsworth Pub. Co.
- Johnson, S., (2007). Microsoft Power Point 2007; Pearson Paravia Bruno
- Malvino, A. P., Leach, D. P., (1981). Digital Principles and Applications; Tata McGraw Hill
- Mano, M. M., and Kime, C. R., (2004). Logic and Computer Design Fundamental; Prentice Hall
- Rajaraman, V., (2003). Fundamentals of Computer, Prentice Hall Publisher
- Rajaraman, V., (2008). Computer Primer; Prentice Hall of India Pvt. Ltd.
- Sarkar, A., and Gupta, S. K., (2002). Elements of computer Science, S Chand and Company, New Delhi
- Sarkar, A., and Gupta, S. K., (2002). Elements of Computer Science, S Chand and Company, New Delhi
- Shepard, A., (2007). Perfect Pages; Shepard Publications
- Tyson, H. L., (2007). Microsoft Word 2007 Bible; John Wiley
- Walkenbach, J., (2007). Excel 2007 Bible; John Wiley

SEMESTER II

Type: Major

PAPER: II (Theory)

CODE: GEOG-M-T-2

COURSE TITLE: POPULATION AND SETTLEMENT GEOGRAPHY

Total Marks: 75

Credits: 6

Course Evaluation: Semester End Examination (60 Marks) and Internal Assessment (15 Marks)

Course Objectives:

- To understand the fundamental concepts of Population and Settlement Geography
- To study population dynamics and theories of population growth
- To evaluate population policies of India and Sweden
- To study the nature and morphology of rural and urban settlements
- To study the spatial arrangement of settlements with their economic activities

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- acquire clear knowledge on fundamental concepts of Population and Settlement Geography.
- familiarise with the development of Population and Settlement Geography.
- understand population dynamics, nature of population growth and migration
- acquire knowledge of population policies adopted in India and Sweden
- understand the nature and morphology of rural and urban settlements

Professional Skill Development Opportunities of the Course:

The acquire knowledge will help the learners to build better foundation for further studies and research in Population Geography and Settlement Geography. This course will be efficient to develop analytical skills and data analysis skills. Learners will improve their employability skills from this course.

Course Content:

UNIT I: POPULATION GEOGRAPHY

1. Development of Population Geography; Relation between Population Geography and Demography
2. Determinants of Population Dynamics: Fertility, Mortality and Migration
3. Population Composition (Age-Sex and Occupational Structure)
4. Theories of population growth: Malthus and Marx; Demographic Transition Theory (Thompson and Notestein)
5. Migration: types, causes and theories
6. Population Policies (India and Sweden)

UNIT II: SETTLEMENT GEOGRAPHY

1. Development of Settlement Geography
2. Rural settlement: Site, situation, types and pattern
3. Morphology of rural settlements: layout-internal and external
4. Urban settlements: Census definition, Urban agglomeration; Urban sprawl, Rural-urban continuum, Rurban and Periurban
5. Urban morphology: Classical Models of Burgess, Hoyt, Harris and Ullman
6. Central Place Theory and hierarchy of settlements

Suggested Readings:

- Barrett, H. R., (1995). Population Geography, Oliver and Boyd, Edinburgh.
- Chandana, R.C. and Sidhu, M.S., (1996). Geography of Population: Concepts Determinants and Pattern, Kalyani Publishers, New Delhi.
- Chisholm, M., (1967). Rural Settlement and Land use, John Wiley, New York.
- Clarke J. I., (1965). Population Geography, Pergamon Press, Oxford.
- Doniel, P. and Hopkinson, M., (1986). The Geography of Settlement, Oliver & Boyd, Edinburgh.
- Garnier J.B., (1978). Geography of Population, Longman, London.
- Hassan, M.I., (2005). Population Geography, Rawat Publications, Jaipur.
- Hudson, F.S., (1976). A Geography of Settlements, Macdonald and Evans, New York.
- Jones, H. R., (2000). Population Geography, 3rd edition, Paul Chapman, London.
- Pacione M.(ed), (1986). Population Geography: Progress & Prospect, Routledge, London.
- Singh, R.Y., (2002). Geography of Settlements, Rawat Publications, Jaipur.

SEMESTER II

Type: Minor

PAPER: I (Theory)

COURSE CODE: GEOG-MI-T-1

COURSE TITLE: PHYSICAL GEOGRAPHY

Total Marks: 50

Credits: 4

Course Evaluation: Semester End Examination (40 Marks) and Internal Assessment (10 Marks)

Course Objectives:

- To obtain fundamental knowledge of Physical Geography
- To study continental drift and plate tectonics theories
- To study the earth surface processes, landforms and their evolution
- To understand the basic ideas of atmosphere
- To study the basic ideas of soil and biome.

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- understand fundamental knowledge in Physical Geography
- obtain knowledge on the earth's interior, theories of continental drift and plate tectonics
- understand fundamental knowledge of the earth surface processes, landforms and their evolution
- acquire basic knowledge of atmosphere
- obtain basic ideas of hydrological cycle, soil and biome

Professional Skill Development Opportunities of the Course:

The obtained knowledge of this course will increase the interest of the learners for further study in Physical Geography particularly in the fields of Geotectonics, Geomorphology, Soil Geography and Biogeography. This course will help the learners in developing analytical skills, observational skills and critical thinking abilities.

Course Content:

1. Internal structure of the earth
2. Continental drift theory: Mechanism, evidences and criticisms
3. Plate tectonics: Mechanism and resultant landforms
4. Geomorphic process: Weathering
5. Processes and landforms: Fluvial, Glacial, Aeolian and Coastal
6. Composition and structure of the atmosphere
7. Insolation, Heat budget, Horizontal and vertical distribution of temperature
8. Hydrological cycle
9. Definition of soil, concept of soil profile and soil forming factors; Types of soil: Zonal, Azonal and Intrazonal
10. Concept of ecology and ecosystem; Biome: Tropical rain forest and Taiga

Suggested Readings:

- Barry, R. G, Chorley R. J., (2009). Atmosphere Weather and Climate. 9th Ed, Routledge.
- Biswas, T.D., and Mukherjee, S.K., (1997). Textbook of Soil Science. Tata McGraw Hill, New Delhi.
- Brady, N.C. and Weil, R.R., (1996). The Nature and Properties of Soil, 11th edition, Longman, London
- Chapman, J.L. and Rens, M.J., (1993). Ecology: Principle and Applications. Cambridge University Press,
- Conserva H. T., (2004). Illustrated Dictionary of Physical Geography, Author House, USA.
- Critchfield, H. J., (1987). General Climatology, Prentice-Hall of India, New Delhi.
- Daji, J. A., Kadam, J.R., Patil, N.D. 1996 A Textbook of Soil Science, Media Promoters and Publishers Pvt Ltd.
- Garrett N., (2000). Advanced Geography, Oxford University Press.
- Goudie, A., (1984). The Nature of the Environment: An Advanced Physical Geography, Basil Blackwell Publishers, Oxford.
- Huggett, R., (1998). Fundamentals of Biogeography, Routledge, London
- Kormondy, E.J., (1996). Concept of Ecology, 4th edition, Prentice-Hall, New Delhi.
- Husain M., (2002). Fundamentals of Physical Geography, Rawat Publications, and Jaipur.
- Lal, D. S., (2012). Climatology. Sharda Pustak Bhawan.
- Monkhouse, F.J.,(2009). Principles of Physical Geography, Platinum Publishers, Kolkata.
- Strahler A.N. and Strahler A.H., (2008). Modern Physical Geography, John Wiley & Sons, New York.
- Trewartha, G. T. and Horne L. H., (1980). An Introduction to Climate, 5th edition, McGraw Hill Higher Education, New York

SEMESTER II

Type: Multidisciplinary Course

PAPER: II (Theory)

COURSE CODE: GEOG-MU-T-1

COURSE TITLE: DISASTER MANAGEMENT

Total Marks: 45

Credits: 3

Course Evaluation: Semester End Examination (35 Marks) and Internal Assessment (10 Marks)

Course Objectives:

- To acquire knowledge about basic concepts of disaster management
- To study the major natural and manmade disasters in India
- To learn disaster management strategies

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- learn the basic concepts in disaster management.
- understand the nature of natural and manmade disasters in India
- develop strategies for disaster management to sustain social development

Professional Skill Development Opportunities of the Course:

This course will help the learners in developing problem solving skills and observational skills. The acquired knowledge from this course will help the learners to develop effective strategies for management of disasters.

Course Content:

1. Definition and Concepts: Hazards, Disasters; Risk and Vulnerability; Classification of hazards
2. Flood, drought, landslide: causes, impact and distribution in India
3. Earthquake: causes, effects and seismic zones of India; Tsunami: causes and effects
4. Tropical Cyclone: structure, formation and impact with reference to India
5. Manmade disasters in India: soil erosion and accidental release of toxic chemicals – causes and impact
6. Disasters - response and mitigation measures: Institutional set up - NDMA and NIDM; Indigenous knowledge and community-based Disaster Management; Do's and Don'ts during and post disasters

Suggested Readings:

- Alexander, D., (1993). Natural Disasters, ULC Press Ltd., London.
- Collins, L.R., and Schneid, T.D., (2000). Disaster Management and Preparedness, Taylor and Francis, Florida.
- Edwards, B., (2005). Natural Hazards, Cambridge University Press, Cambridge.
- Gupta, H.K., (2010). Disaster Management, Universities Press India, Hyderabad.
- Kapur, A., (2010). Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.
- Modh, S., (2010). Managing Natural Disaster: Hydrological, Marine and Geological Disasters. Macmillan, New Delhi.
- Singh, J., (2007). Disaster Management, Future Challenges and Opportunities, I.K. International Pvt. Ltd., New Delhi.
- Singh, R.B., (2005). Risk Assessment and Vulnerability Analysis, IGNOU, New Delhi.
- Singh, R.B., (2006). Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, Jaipur.
- Sinha, A., (2001). Disaster Management: Lessons Drawn and Strategies for Future, New United Press, New Delhi
- Smith, K., (2011). Natural Hazards, Routledge, London
- Stoltman, J.P. et al., (2004). International Perspectives on Natural Disasters, Kluwer Academic Publications, Dordrecht.

SEMESTER II

Type: Skill Enhancement Course (SEC)

PAPER: II (Practical)

CODE: GEOG-SEC-P-2

COURSE TITLE: FIELD WORK

Total Marks: 45

Credits: 3

Course Evaluation: Semester End Examination* (35 Marks) and Internal Assessment (10 Marks)

***Field Report + Viva-voce: 20+15 = 35 Marks**

Course Objectives:

- To develop ability to identify region specific physical and socio-economic problems
- To increase the ability to learn field survey techniques and expertise in field survey instruments
- To develop expertise in quantitative and qualitative analysis of field-based data and information
- To learn data analysis techniques, data representation, mapping and field report writing

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- acquire knowledge, skills and expertise to identify geographical issues
- achieve skills and expertise to use various survey techniques and instruments
- expertise in field-based data collection, analysis and presentation
- prepare field report
- build capacity to interact with people of diverse culture

Professional Skill Development Opportunities of the Course:

This course is highly effective for professional skill development, particularly observation skills, data analysis skills, problem solving skills and cartographic skills.

Course Content:

Students are required to carry out a comprehensive field work in a village/mouza/town/C.D. Block/drainage basin selecting a particular research problem. There should be a clear-cut title, problem statement, objectives, methodology and major findings. The text of the report should not exceed 5000 words and 15-20 pages of illustrations (A4 Pages). The diagrams and illustrations should be prepared in computer using the standard format

Guidelines for preparation of Field Report:

The following methods are to be followed for framework:

1. Framing of relevant questionnaire/survey schedule for assessing the physical /cultural /environment /socio-economic components. A filled-in questionnaire used in the survey should be attached with the report signed by the concerned teacher and the student.
2. Drawing of maps (hand-drawn) with suitable scale and latitude and longitude.
3. Preparation of charts/graphs in MS-Excel and duly labelled.
4. The report should be typed in MS-Word. The font size is fixed at 12 in Times New Roman and the line spacing 1.5.
5. Each field work should have a certificate of authenticity duly signed by the Field supervisor.

Suggested Readings:

- Creswell J., (1994). *Research Design: Qualitative and Quantitative Approaches* Sage Publications.
- Evans M., (1988). "Participant Observation: The Researcher as Research Tool" in *Qualitative Methods in Human Geography*, eds. J. Eyles and D. Smith, Polity.
- Kothari, C. R., (2019). *Research Methodology: Methods and Techniques*, 4th edition, New Age International Publishers, New Delhi.
- Lavrakas, P. L.(ed),(2008). *Encyclopedia of Survey Research Methods*, Sage Publication, Inc., California.
- McCarroll, D.,(2017). *Simple Statistical Tests for Geography*, CRC Press, Taylor & Francis Group, Florida.
- Mukherjee, N.,(2002). *Participatory Learning and Action: with 100 Field Methods*. Concept Pubs. Co., New Delhi
- Robinson A., (1998). "Thinking Straight and Writing That Way", in *Writing Empirical Research Reports: A Basic Guide for Students of the Social and Behavioural Sciences*, eds. by F. Pryczak and R. Bruce Pryczak, Publishing: Los Angeles. Page 27
- Stoddard, R.H., (1982). *Field Techniques and Research Methods in Geography*, Kendall/Hunt Publishing Company, Dubuque, Iowa.
- Tuan, Y.F., (1990). *Topophilia: A Study of Environmental Perception, Attitudes, and Values*, Cambridge University Press, Cambridge.
- UNESCO, (1978). *Guidelines for Field Studies in Environmental Perception*, The United Nations Educational, Scientific and Cultural Organization, Paris.

SEMESTER III

Type: Major

PAPER: III (Theory)

COURSE CODE: GEOG-M-T-3

COURSE TITLE: FUNDAMENTALS OF REMOTE SENSING, GIS AND GNSS

Total Marks: 75

Credits: 6

Course Evaluation: Semester End Examination (60 Marks) and Internal Assessment (15 Marks)

Course Objectives:

- To obtain knowledge about the fundamental concepts of remote sensing and GIS
- To study the applications of remote sensing and GIS
- To understand the principles of image interpretation
- To acquire basic knowledge about GPS and GNSS

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- understand fundamental concepts of remote sensing and GIS
- acquire basic knowledge about GPS and GNSS
- understand the principles of image interpretation
- familiar about the applications of remote sensing and GIS

Professional Skill Development Opportunities of the Course:

The obtained fundamental knowledge of this course will increase interest of the learners in Geospatial Technology. This course is highly effective in developing technical skills, digital skills, observational skills and data analysis skills of the learners. This course has a wide scope of employment opportunity.

Course Content:

UNIT I: FUNDAMENTALS OF REMOTE SENSING

1. Definition and stages of remote sensing; EMR and its spectral ranges
2. Remote sensing platforms, satellites and sensors
3. Sensor resolutions and their applications with reference to IRS and LANDSAT missions
4. Concept of FCC; Principles of image interpretation (visual and digital)
5. Aerial Photographs: types, geometry and photo interpretation keys
6. Applications of remote sensing in managing agriculture, water and forest resources; Monitoring urban growth and environmental degradation

UNIT II: FUNDAMENTALS OF GIS AND GNSS

1. Definition, components and applications of GIS
2. GIS data structures types: spatial and non-spatial, raster and vector
3. Principles of preparing attribute tables, data manipulation and overlay analysis
4. Principles and significance of buffer preparation
5. Basic concept of GPS
6. Principles of GNSS positioning and waypoint collection; GIS-GNSS integration

Suggested Readings:

- Bhatta, B., (2021). Remote Sensing and GIS. 3rded, OUP India.
- Bolstad, P., (2016). GIS Fundamentals: A First Text on Geographic Information Systems. 5thed, XanEdu Publishing Inc.
- Campbell, J. B. and Wynne, R. H., (2011). Introduction to Remote Sensing. 5thed, Guildford Press.
- Chang, K-t., (2017). Introduction to Geographical Information System. 4thed, McGraw-Hill Education.
- Jensen, J. R., (2005). Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice Hall.
- Jensen, J.R., (2013). Remote Sensing of the Environment: An Earth Resource Perspective. Pearson Education India.
- Joseph, G. and Jegannathan, C., (2018). Fundamentals of Remote Sensing. 3rded, The Orient Blackswan
- Lillesand, T.M., Kiefer, R.W., Chipman, J.W., (2015). Remote Sensing and Image Interpretation. 7thed, Wiley.
- Nag, P. and Kudrat, M., (1998). Digital Remote Sensing, Concept Publishing Company, New Delhi.
- Rees, W. G., (2012). Physical Principles of Remote Sensing, 3rded, Cambridge University Press.
- Wolf, P. R., Dewitt, B. A. and Wilkinson, B.E., (2014). Elements of Photogrammetry with Applications in GIS, McGraw-Hill Education

SEMESTER III

Type: Minor

PAPER: II (Theory)

COURSE CODE: GEOG-MI-T-2

COURSE TITLE: HUMAN GEOGRAPHY

Total Marks: 50

Credits: 4

Course Evaluation: Semester End Examination (40 Marks) and Internal Assessment (10 Marks)

Course Objectives:

- To acquire knowledge about the major themes of Human Geography
- To study the distribution and growth of population in India
- To study the changing nature of demographic regime
- To understand the nature of human migration and sectors of economy
- To study the types and pattern of rural settlements and functional classification of town
- To provide a comprehensive view of major ethnic groups in India
- To study the central themes in Cultural Geography and basic aspects of human development

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- understand the key themes of Human Geography
- acquire knowledge of population in India with spatio-temporal context
- understand the changing nature of population dynamics in relation to economic growth, social development and cultural change
- build concrete ideas about human migration and different economic sectors
- gain knowledge about the nature of rural and urban settlements
- acquire knowledge about ethnic identity of major ethnic groups in India
- learn to measure the progress of a country in terms of economic and social development

Professional Skill Development Opportunities of the Course:

This course will help the learners for further studies in different sub-branches of Human Geography. This course focuses on the development of critical thinking skills, analytical and data analysis skills.

Course Content:

1. Distribution and growth of population in India
2. Demographic Transition Theory
3. Migration: Concept, types and causes
4. Economic activities: Primary, Secondary and Tertiary
5. Types and patterns of rural settlements
6. Urban settlement: Census definition and characteristics
7. Functional classification of towns
8. Major ethnic groups in India: Santhal, Gond, Toda and Khasi
9. Concept of culture, Cultural hearths and Cultural diffusion
10. Human Development Index

Suggested Readings:

- Chandana, R.C. and Sidhu, M.S., (1996). *Geography of Population: Concepts Determinants and Pattern*, Kalyani Publishers, New Delhi
- Daniel, P.A. and Hopkinson, M.F., (1989). *The Geography of Settlement*, Oliver & Boyd, London.
- Haq, M., (2000). *Reflections on Human Development*, Oxford University Press, New Delhi
- Johnston R; Gregory D, Pratt G.etal.,(2008). *The Dictionary of Human Geography*, Blackwell Publication.
- Jordan et al., (2006). *The Human Mosaic: A Thematic Introduction to Cultural Geography*. W.H. Freeman and Company, NewYork.
- Ghosh,S., (2015). *Introduction to Settlement Geography*. Orient Black Swan Private Ltd., Kolkata
- Norton, W., (2006). *Cultural Geography: Environments, Landscapes, Identities, Inequalities*, Oxford University Press, Toronto
- Rubenstein, J.M., (2002). *The Cultural Landscape*, 7th edition, Prentice Hall, Englewood Cliffs
- Singh, R.Y., (2002). *Geography of Settlements*, Rawat Publications, Jaipur.

SEMESTER III

Type: Multidisciplinary Course

PAPER: III (Theory)

COURSE CODE: GEOG-MU-T-1

COURSE TITLE: DISASTER MANAGEMENT

Total Marks: 45

Credits: 3

Course Evaluation: Semester End Examination (35 Marks) and Internal Assessment (10 Marks)

Course Objectives:

- To acquire knowledge about basic concepts of disaster management
- To study the major natural and manmade disasters in India
- To learn disaster management strategies

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- learn the basic concepts in disaster management.
- understand the nature of natural and manmade disasters in India
- develop strategies for disaster management to sustain social development

Professional Skill Development Opportunities of the Course:

This course will help the learners in developing problem solving skills and observational skills. The acquired knowledge from this course will help the learners to develop effective strategies for management of disasters.

Course Content:

1. Definition and Concepts: Hazards, Disasters; Risk and Vulnerability; Classification of hazards
2. Flood, drought, landslide: causes, impact and distribution in India
3. Earthquake: causes, effects and seismic zones of India; Tsunami: causes and effects
4. Tropical Cyclone: structure, formation and impact with reference to India
5. Manmade disasters in India: soil erosion and accidental release of toxic chemicals – causes and impact
6. Disasters - response and mitigation measures: Institutional set up - NDMA and NIDM; Indigenous knowledge and community-based Disaster Management; Do's and Don'ts during and post disasters

Suggested Readings:

- Alexander, D., (1993). Natural Disasters, ULC Press Ltd., London.
- Collins, L.R., and Schneid, T.D., (2000). Disaster Management and Preparedness, Taylor and Francis, Florida.
- Edwards, B., (2005). Natural Hazards, Cambridge University Press, Cambridge.
- Gupta, H.K., (2010). Disaster Management, Universities Press India, Hyderabad.
- Kapur, A., (2010). Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.
- Modh, S., (2010). Managing Natural Disaster: Hydrological, Marine and Geological Disasters. Macmillan, New Delhi.
- Singh, J., (2007). Disaster Management, Future Challenges and Opportunities, I.K. International Pvt. Ltd., New Delhi.
- Singh, R.B., (2005). Risk Assessment and Vulnerability Analysis, IGNOU, New Delhi.
- Singh, R.B., (2006). Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, Jaipur.
- Sinha, A., (2001). Disaster Management: Lessons Drawn and Strategies for Future, New United Press, New Delhi
- Smith, K., (2011). Natural Hazards, Routledge, London
- Stoltman, J.P. et al., (2004). International Perspectives on Natural Disasters, Kluwer Academic Publications, Dordrecht.

SEMSTER III

Type: Skill Enhancement Course (SEC)

PAPER: III (Practical)

CODE: GEOG-SEC-P-3

COURSE TITLE: APPLICATIONS OF REMOTE SENSING AND GIS

Total Marks: 45

Credits: 3

Course Evaluation: Semester End Examination (25+10* = 35 Marks) and Internal Assessment (10 Marks)

***Laboratory Note Book + Viva-voce: 5+5 = 10**

Course Objectives:

- To develop skills in digital image processing and image interpretation
- To develop pruriency in digitization, georeferencing and preparation of annotated thematic maps
- To provide skills and expertise in remote sensing and GIS applications to solve geographical questions

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- develop expertise in digital image processing and image interpretation
- develop skills in digitization, georeferencing and preparation of annotated thematic maps
- acquire skills to solve geographical questions using remote sensing and GIS

Professional Skill Development Opportunities of the Course:

This course has the great potential to advance the learner's career. This course is highly effective to develop digital data analysis skills, observation skills, technical skills. This course has a wide variety of employment opportunities.

Course Content

1. Acquisition procedure of free geospatial data from NRSC /Bhoonidhi and USGS
2. Georeferencing of maps and images; Digitisation of features: Point, Line and Polygon
3. Data attachment and preparation of thematic map (bargraph, pie-chart and choropleth);
Overlay analysis
4. Preparation of FCC using IRS LISS-III/IV and/or LANDSAT (ETM+) data; Image enhancement
5. Preparation of LULC map by Supervised Image Classification (Maximum Likelihood) using IRS LISS-III/IV or LANDSAT (ETM+) data

[Note: Using Q-GIS (open access) software]

***A Project File of exercises consisting of each theme is to be submitted**

Suggested Readings:

- Bhatta, B., (2021). Remote Sensing and GIS. 3rded, OUP India.
- Bolstad, P., (2016). GIS Fundamentals: A First Text on Geographic Information Systems. 5thed, XanEdu Publishing Inc.
- Brewer, C.A., (2015). Designing Better Maps: A Guide for GIS Users. 2nded, Esri Press.
- Campbell, J. B. and Wynne, R. H., (2011). Introduction to Remote Sensing. 5thed, Guildford Press.
- Chang, K-t., (2017). Introduction to Geographical Information System. 4thed, McGraw-Hill Education.
- Harvey, F., (2015). A Primer of GIS: Fundamental Geographic and Cartographic Concepts. 2nded, The Guilford Press.
- Jensen, J.R., (2013). Remote Sensing of the Environment: An Earth Resource Perspective. Pearson Education India.
- Joseph, G. and Jegannathan, C., (2018). Fundamentals of Remote Sensing. 3rd ed, The Orient Blackswan.
- Lillesand, T.M., Kiefer, R.W., Chipman, J.W., (2015). Remote Sensing and Image Interpretation. 7thed, Wiley.

SEMESTER IV

Type: Major

PAPER: IV (Theory)

CODE: GEOG-M-T-4

COURSE TITLE: CLIMATOLOGY, SOIL AND BIOGEOGRAPHY

Total Marks: 75

Credits: 6

Course Evaluation: Semester End Examination (60 Marks) and Internal Assessment (15 Marks)

Course Objectives:

- To understand the fundamental concepts in climatology, soil and biogeography
- To study the atmospheric temperature distribution, circulation, climatic classification
- To study the profile, properties and classification of soil
- To explain the Bio-geochemical cycles, biodiversity loss

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- understand fundamental knowledge in climatology, soil and biogeography
- obtain adequate knowledge on the temperature distribution, heat budget, air mass, monsoon, climatic classification
- acquire comprehensive knowledge of soil profile, properties, soil classification
- understand the ecosystem, biome and biodiversity

Professional Skill Development Opportunities of the Course:

The obtained fundamental knowledge and concept of this course will increase the interest of the learners for further study and research in Climatology, Soil and Biogeography. This course is also effective in developing observational skills and critical thinking abilities of the learners.

Course Content:

UNIT I: CLIMATOLOGY

1. Temperature: Horizontal and vertical distribution; Heat budget of the atmosphere; Inversion of temperature: types and causes
2. Circulation in the Atmosphere: Planetary winds; Jet stream
3. Air mass and front: Origin, characteristics and types
4. Monsoon Circulation and Mechanism with reference to India
5. Condensation: Processes and forms; Mechanism of precipitation: Bergeron-Findeisen Theory, Collision and coalescence; Forms of precipitation
6. Concept of climate change; Climatic Classification after Köppen and Thornthwaite (1931 and 1948)

UNIT II: SOIL AND BIOGEOGRAPHY

1. Factors of soil formation; Concept of soil profile; origin and profile characteristics of Laterite, Podzol and Chernozem soils
2. Physical and chemical properties of soil: Texture, structure and moisture, pH, organic matter and NPK
3. Principles of soil classification: Genetic and USDA. Concept of land capability and its classification
4. Concepts of ecology, biosphere, ecosystem, biome, ecotone, community; Energy flow in ecosystems
5. Geographical extent and characteristic features of Tropical rain forest, Taiga and Grassland biomes
6. Bio-geochemical cycles with special reference to carbon dioxide and nitrogen; Bio-diversity: Definition, types, threats and conservation measures

Suggested Readings:

- Barry, R. G., and Carleton, A. M.(2001). Synoptic and Dynamic Climatology, Routledge, UK
- Barry, R. G., and Chorley, R. J.(1998). Atmosphere, Weather and Climate, Routledge, New York
- Critchfield, H. J.(1987). General Climatology, Prentice-Hall of India, New Delhi
- Lal, D. S.(1993). Climatology, 3rd edition, Chaitanya Pub. House, New Delhi
- Lutgens, F. K., Tarbuck, E. J., and Tasa D. (2009). The Atmosphere: An Introduction to Meteorology, Prentice-Hall, Englewood Cliffs, New Jersey
- Oliver, J. E., and Hidore, J. J.(2002). Climatology: An Atmospheric Science, Pearson Education, New Delhi
- Singh, S. (2013). Climatology, Prayag Pustak Bhawan, Allahabad
- Trewartha, G. T., and Horne L. H.(1980). An Introduction to Climate, McGraw
- Biswas, T.D. and Mukherjee, S.K. (1997). Textbook of Soil Science, TataMcGraw Hill
- Bridges, E. M., (1990). World Geomorphology, Cambridge University Press, Cambridge
- Brady, N.C. and Weil, R.R. (1996). The Nature and Properties of Soil, 11th edition, Longman, London
- Floth, H.D. (1990) Fundamentals of Soil science, 8th edition, John Wiley and Sons, New York
- Chapman, J.L. and Rens, M.J. (1993). Ecology: Principle and Applications, Cambridge University Press, Cambridge
- Huggett, R. (1998). Fundamentals of Biogeography, Routledge, London
- Kormondy, E.J. (1996). Concept of Ecology, 4th edition, Prentice-Hall, India, New Delhi
- Myers, A.A. and Giller, P.S. (editors) (1998). Analytical Biogeography: an Integrated Approach to Study and Plant Distribution. Chapman and Hall, Lo

SEMESTER IV

Type: Major

PAPER: V (Practical)

CODE: GEOG-M-P-5

COURSE TITLE: CARTOGRAPHIC TECHNIQUES AND SURVEYING

Total Marks: 75

Credits: 6

Course Evaluation: Semester End Examination (50+10* = 60 Marks) and Internal Assessment (15 Marks)

***Laboratory Note Book + Viva-voce: 5+5 = 10**

Course Objectives:

- To develop knowledge and skills in Cartography and Surveying
- To develop ability and skills in drawing scales and representation of data on maps
- To enhance ability in drawing cartograms with interpretation
- To develop ability and skills in traverse surveying and determination of height of objects

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- acquire practical knowledge and skills in Cartography and Surveying
- improve skills in drawing scales and representation of data on maps
- prepare cartograms and to interpret appropriately
- develop expertise in traverse surveying and determination of height of objects

Professional Skill Development Opportunities of the Course:

The course will help the learners to build basic foundation for further studies and research in Cartography and Surveying. This course will be effective to develop analytical skills, data analysis skills, spatial analysis skills, observational skills and data visualisation skills. This course offers employment opportunities.

Course Content:

1. Construction of Scales: Linear, Comparative, Diagonal and Vernier
2. Representation of Data on Map by Proportional Circles, Dots and Spheres, Isolpleth and Choropleth methods
3. Diagrammatic Representation of Data: Bar and Age-sex Pyramid Diagram, Pie Diagram
4. Preparation and Interpretation of Climograph, Taylor Hythergraph and Ergograph
5. Measures of Concentration: Location Quotient
6. Proximity Analysis: Nearest Neighbour Analysis
7. Traversing by Prismatic Compass and Dumpy Level Surveying with One Change Point (profile drawing and contouring)
8. Determination of height of objects by Transit Theodolite (level ground base accessible case)

***A Project File of exercises consisting of each theme is to be submitted**

Suggested Readings:

- Agor, R. (1980). Textbook of Surveying and Levelling, Khanna Publishers, Delhi.
- Anson, R. and Ormelling, F. J., (1994). International Cartographic Association: Basic Cartographic Vol., Pregmen Press.
- Gupta, K. K. and Tyagi, V. C., (1992). Working with Map, Survey of India, DST, New Delhi.
- Mishra, R. P. and Ramesh, A., (1989). Fundamentals of Cartography, Concept, New Delhi.
- Monkhouse, F. J. and Wilkinson H. R., (1973). Maps and Diagrams, Methuen, London.
- Robinson, A.H., Morrison, J.L., Muehrcke, P.C., Kimerling, A.J. and Guphill, S.C. (2009). Elements of Cartography. Wiley.
- Sarkar, A., (2015). Practical Geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi.
- Singh, R. L. and Singh, R. P. B., (1999). Elements of Practical Geography, Kalyani Publishers.

SEMESTER IV

Type: Minor

PAPER: II (Theory)

COURSE CODE: GEOG-MI-T-2

COURSE TITLE: HUMAN GEOGRAPHY

Total Marks: 50

Credits: 4

Course Evaluation: Semester End Examination (40 Marks) and Internal Assessment (10 Marks)

Course Objectives:

- To acquire knowledge about the major themes of Human Geography
- To study the distribution and growth of population in India
- To study the changing nature of demographic regime
- To understand the nature of human migration and sectors of economy
- To study the types and pattern of rural settlements and functional classification of town
- To provide a comprehensive view of major ethnic groups in India
- To study the central themes in Cultural Geography and basic aspects of human development

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- understand the key themes of Human Geography
- acquire knowledge of population in India with spatio-temporal context
- understand the changing nature of population dynamics in relation to economic growth, social development and cultural change
- build concrete ideas about human migration and different economic sectors
- gain knowledge about the nature of rural and urban settlements
- acquire knowledge about ethnic identity of major ethnic groups in India
- learn to measure the progress of a country in terms of economic and social development

Professional Skill Development Opportunities of the Course:

This course will help the learners for further studies in different sub-branches of Human Geography. This course focuses on the development of critical thinking skills, analytical and data analysis skills.

Course Content:

1. Distribution and growth of population in India
2. Demographic Transition Theory
3. Migration: Concept, types and causes
4. Economic activities: Primary, Secondary and Tertiary
5. Types and patterns of rural settlements
6. Urban settlement: Census definition and characteristics
7. Functional classification of towns
8. Major ethnic groups in India: Santhal, Gond, Toda and Khasi
9. Concept of culture, Cultural hearths and Cultural diffusion
10. Human Development Index

Suggested Readings:

- Chandana, R.C. and Sidhu, M.S., (1996). *Geography of Population: Concepts Determinants and Pattern*, Kalyani Publishers, New Delhi
- Daniel, P.A. and Hopkinson, M.F., (1989). *The Geography of Settlement*, Oliver & Boyd, London.
- Haq, M., (2000). *Reflections on Human Development*, Oxford University Press, New Delhi
- Johnston R; Gregory D, Pratt G.etal.,(2008). *The Dictionary of Human Geography*, Blackwell Publication.
- Jordan et al., (2006).*The Human Mosaic: A Thematic Introduction to Cultural Geography*. W.H. Freeman and Company, NewYork.
- Ghosh,S., (2015). *Introduction to Settlement Geography*. Orient Black Swan Private Ltd., Kolkata
- Norton, W., (2006). *Cultural Geography: Environments, Landscapes, Identities, Inequalities*, Oxford University Press, Toronto
- Rubenstein, J.M., (2002). *The Cultural Landscape*, 7th edition, Prentice Hall, Englewood Cliffs
- Singh, R.Y., (2002). *Geography of Settlements*, Rawat Publications, Jaipur.

SEMESTER V

Type: Major

PAPER: VI (Theory)

COURSE CODE: GEOG-M-T-6

COURSE TITLE: HYDROLOGY AND OCEANOGRAPHY

Total Marks: 75

Credits: 6

Course Evaluation: Semester End Examination (60 Marks) and Internal Assessment (15 Marks)

Course Objectives:

- To understand the fundamental concepts in hydrology and oceanography
- To study the hydrological cycle, aquifers, principles of groundwater, concept of basin hydrology and hydrological measurements
- To study the relief of oceans, composition of ocean water, ocean water movement, and ocean water deposits
- To analyse integrated water resources management system and marine hazards

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- understand fundamental knowledge in hydrology and oceanography
- obtain adequate knowledge on global hydrological cycle, surface and groundwater movements, ocean water movement
- acquire comprehensive knowledge of integrated water resources management and methods of water conservation
- understand the dynamic nature of the aquifers and oceans

Professional Skill Development Opportunities of the Course:

The obtained fundamental knowledge and concept of this course will increase the interest of the learners for further study and research in Physical Geography and water resources. This course is also effective in developing observational skills and critical thinking abilities of the learners.

Course Content:

UNIT I: HYDROLOGY

1. Scope and content of Hydrology
2. Global hydrological cycle: Concept and significance; Concept of water budget
3. Principles of groundwater: Storage, movement and discharge; Aquifers: Types and issues related to overutilization
4. Concept of basin hydrology and run off cycle
5. Unit hydrograph, rating curve and their applications
6. Concept of integrated water resources management; Methods of water conservation: Rainwater harvesting and watershed management

UNIT II: OCEANOGRAPHY

1. Relief of oceans; bottom reliefs of Atlantic, Pacific and Indian Oceans
2. Composition of ocean water: Temperature, density and salinity; T-S Diagram
3. Ocean water movement: Warm and cold currents of Atlantic, Pacific and Indian Oceans, waves, tides
4. Coral reefs: Theories of origin, favourable conditions, types, coral bleaching
5. Ocean water deposits
6. Marine resources: classification, significance and sustainable use

Suggested Readings:

- Basu, S.K. (2003). *Hand Book of Oceanography*. Global Vision Publishing House, Delhi.
- Chow, V., Maidment, D. and Mays, L. (2017). *Applied Hydrology*, McGraw Hill Education, New York.
- Davie, T. (2008). *Fundamentals of Hydrology*, 2nd edition, Routledge, London.
- Jenkins, J.T. (1921). *A textbook of Oceanography*. Constable and Company Publication, London.
- Lal, D.S. (2023). *Oceanography*. Sharda Pustak Bhawan, Prayagraj.
- Reddy, P. J. R. (2011). *A Text Book of Hydrology*, 3rd edition, USP pub.
- Sharma, R.C. & Vatal, M. (2017). *Oceanography for Geographers*. Surjeet Publications, Delhi.
- Singh, S. (2021). *Oceanography*. Pravalika Publications, Allahabad.
- Trujillo, A.P. & Thurman, H.V. (2016). *Essentials of Oceanography*. Pearson Publication, Noida.

SEMESTER V

Type: Major

PAPER: VII (Practical)

COURSE CODE: GEOG-M-P-7

COURSE TITLE: MAP PROJECTION, MAP INTERPRETATION AND IDENTIFICATION OF ROCKS AND MINERALS

Total Marks: 75

Credits: 6

Course Evaluation: Semester End Examination (50+10* = 60 Marks) and Internal Assessment (15 Marks)

***Laboratory Note Book + Viva-voce: 5+5 = 10**

Course Objectives:

- To develop knowledge and skills in Map Projections, Map interpretation and identification of Rocks and Minerals
- To develop ability and skills in calculating and drawing Map Projections
- To enhance ability in Morphometric Analysis on Drainage Basin
- To develop ability and skills in interpreting Topographical Maps
- To develop ability and skills in interpreting Geological maps
- To enhance ability and skills in megascopic identification of Rocks and Minerals

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- acquire practical knowledge and skills in Map Projections, Map interpretation and identification of Rocks and Minerals
- improve ability and skills in calculating and drawing Map Projections
- acquire knowledge and skills in Morphometric Analysis on Drainage Basin and to interpret appropriately
- develop expertise in Geological Map interpretation
- Improve ability and expertise in megascopic identification of Rocks and Minerals

Professional Skill Development Opportunities of the Course:

The course will help the learners to build basic foundation for further studies and research in Map Projection, Topographical and Geological Maps interpretation and megascopic identification of rocks and minerals. This course will be highly effective to enhance data analysis skills, analytical skills, spatial analysis skills, observational skills and data visualisation skills. This course also offers employment opportunities.

Course Content:

1. Map Projections: Classification, properties and uses; concept and significance of UTM projection
2. Construction of Projections: Simple Conical with One Standard Parallel Projection, Bonne's Projection, Cylindrical Equal Area Projection, Mercator's Projection and Polar Zenithal Stereographic Projection
3. Construction and Interpretation of Relief Profiles (Superimposed, Projected and Composite) on Topographical Map (SOI, R.F. 1:50,000)

4. Preparation and Interpretation of Relative Relief Map and Average Slope Map (Wentworth's Method) on a Drainage Basin from Topographical Map (SOI, R.F. 1:50,000)
5. Preparation and Interpretation of Stream Order Maps (After Horton and Strahler) on a Drainage Basin from Topographical Map (SOI, R.F. 1:50,000)
6. Transect Chart: Relationship between physical and cultural features from Topographical Map (SOI, R.F. 1:50,000)
7. Geological Map (Horizontal, Uniclinal, Folded and Faulted Structure): Drawing Geological Section and Interpretation of the Map
8. Megascopic Identification of Rocks and Minerals -
 Rocks: Granite, Basalt, Dolerite, Shale, Sandstone, Limestone, Conglomerate, Laterite, Slate, Phyllite, Schist, Marble, Quartzite and Gneiss
 Minerals: Talc, Gypsum, Calcite, Mica, Feldspar, Quartz, Chalcopyrite, Hematite, Magnetite, Bauxite and Galena

Suggested Readings:

- Mishra, R. P. and Ramesh, A., (1989). Fundamentals of Cartography, Concept, New Delhi.
- Monkhouse, F. J. and Wilkinson H. R., (1971). Maps and Diagrams: Their Compilation and Construction, Methuen & Co Ltd., London.
- Robinson, A.H., Morrison, J.L., Muehrcke, P.C., Kimerling, A.J. and Guptill, S.C., (2009). Elements of Cartography, Wiley India Pvt. Ltd., New Delhi.
- Sarkar, A., (2015). Practical Geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi.
- Singh, R. L. and Singh, R. P. B., (1999). Elements of Practical Geography, Kalyani Publishers.
- Spencer, E.W. (2017). Geologic Maps: A Practical Guide to Preparation and Interpretation, Waveland Press.
- Steers, J. A., (1970). Introduction to the Study of Map Projections, University of London Press, London.
- Zavoianu, I., (2011). Morphometry of Drainage Basins, Volume 20, Elsevier Science.

SEMESTER V

Type: Minor

PAPER: III (Theory)

COURSE CODE: GEOG-MI-T-3

COURSE TITLE: ECONOMIC GEOGRAPHY

Total Marks: 50

Credits: 4

Course Evaluation: Semester End Examination (40 Marks) and Internal Assessment (10 Marks)

Course Objectives:

- To introduce the fundamental knowledge of Economic Geography and its different dimensions
- To explain the economic theories and approaches to economic processes and typologies
- To make aware about the problem-solving approaches of Economic Geography to industrial and transport plan

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- connect economic theories with geographical phenomena.
- get a geographical perspective to examine economic phenomena, including transport effectiveness.
- practically evaluate the problems of economic thoughts and commodification systems.

Professional Skill Development Opportunities of the Course:

This course will help the learners in developing analytical skills, observational skills and critical thinking abilities:

- Students will be able to analyse economic processes theoretically and contribute to policy design.
- Students will be skilled in handling the syllabus for All India basis competitive exams.
- Students will be skilled in employing the modern techniques of GIS to evaluate economic problems

Course Content:

1. Definition, approaches and fundamental concepts of Economic Geography
2. Locational theories – Agriculture (von Thunen) and industry (Weber)
3. Determination of market area: theory of Losch
4. Primary activities – Shifting cultivation, intensive subsistence farming, commercial grain farming, commercial dairy farming, plantation, commercial fishing
5. Primary activities - Mining: Iron ore, coal and petroleum
6. Secondary activities – Iron and steel industry, cotton textile industry and petro-chemical industry
7. Tertiary activities – Modes of transportation, patterns of international trade
8. Quaternary activities: Information and communication technology industry
9. GATT and WTO: Functions and relevance
10. Regional blocks in international trade: SAARC, OPEC, EU

Suggested Readings:

- Alexander J. W. (1963). *Economic Geography*, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
- Bagchi-Sen S. and Smith H. L. (2006). *Economic Geography: Past, Present and Future*, Taylor and Francis.
- Coe N. M., Kelly P. F. and Yeung H. W. (2007). *Economic Geography: A Contemporary Introduction*, Wiley-Blackwell.
- Combes P., Mayer T. and Thisse J. F. (2008). *Economic Geography: The Integration of Regions and Nations*, Princeton University Press.
- Durand L. (1961). *Economic Geography*, Crowell.
- Dutta, R., and Sundaram, K. P. M. (1999). *Indian Economy*. S. Chand and Company Limited, New Delhi
- Galina, S., and Sengupta, P. (1967). *Economic Regionalisation of India*, Census of India
- Hodder B. W. and Lee R. (1974). *Economic Geography*, Taylor and Francis.
- Sharma, T. C. (2013). *Economic Geography of India*. Rawat Publication, Jaipur
- Wheeler J. O. (1998). *Economic Geography*, Wiley.
- Willington D. E. (2008). *Economic Geography*, Husband Press.

SEMESTER VI

Type: Major

PAPER: VIII (Theory)

CODE: GEOG-M-T-8

COURSE TITLE: ECONOMIC GEOGRAPHY AND GEOGRAPHY OF INDIA

Total Marks: 75

Credits: 6

Course Evaluation: Semester End Examination (60 Marks) and Internal Assessment (15 Marks)

Course Objectives:

- To introduce the fundamental knowledge of Economic Geography and its different dimensions
- To explain the economic theories and approaches to economic processes and typologies
- To make aware about the problem-solving approaches of Economic Geography to industrial and transport plan
- To acquaint the student with the physiography, climate, soil, vegetation, population dynamics of India
- To study agriculture, mineral and power resources in India
- To evaluate industrial development in India

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- connect economic theories with geographical phenomena
- get a geographical perspective of economic phenomena, including transport effectiveness.
- evaluate the problems of economic thoughts and commodification systems practically
- acquire clear knowledge on physiography, climate, soil, vegetation, population dynamics of India
- familiarise with the population distribution, growth and population policies adopted in India
- acquire knowledge on mineral and power resources
- understand the nature and development of agriculture and industry

Professional Skill Development Opportunities of the Course:

This course will help the learners in developing analytical skills, observational skills and critical thinking abilities:

- Students will be able to analyse economic processes theoretically and contribute to policy design.
- The acquire knowledge will help the learners to build better foundation for further studies and research in Geography of India.
- Students will be skilled in employing the modern techniques of GIS to evaluate economic problems with reference to India
- Students will be skilled in handling the syllabus for All India basis competitive exams.

Course Content:

UNIT I: ECONOMIC GEOGRAPHY

1. Definition, Approaches and Fundamental Concepts of Economic Geography
2. New Economic Geography and the tenets of Political Economy
3. Locational Theories – Agriculture (Von Thunen) and Industry (Weber)
4. Determination of market areas: Theories of Losch and Palander

5. Economic Activities – Primary: Intensive Subsistence Farming, Commercial Grain Farming, Plantation, Commercial Fishing, and Mining (iron ore, coal and petroleum); Secondary: – Cotton Textile Industry, Petro-Chemical Industry, Major Manufacturing Regions; Tertiary and Quaternary: – Modes of Transportation, Patterns of International Trade, and Information and Communication Technology Industry
6. GATT, WTO, TRIPS, SAARC, OPEC, and EU: Objective, function and relevance

UNIT II: GEOGRAPHY OF INDIA

1. Physical: Geology and Physiographic Divisions; Climate, drainage, soil and vegetation
2. Population: Distribution, growth and policies
3. Settlement System - Rural Settlement: Types and patterns; Urban settlement: Concept and functional classification
4. Resource Base – Livestock (cattle and fisheries), energy resource (coal and hydroelectricity), minerals (iron ore and bauxite).
5. Economy – Agriculture (Rice, Wheat, Sugarcane, Groundnut, Jute, and Cotton); Industries (Cotton Textile, Iron-Steel, Automobile and information technology), Transportation Modes (Road and Rail).
6. Regional planning and developmental issues in North-East India, Damodar Valley region and Sundarban delta

Suggested Readings:

- Deshpande, C. D. (1992). India: A Regional Interpretation, ICSSR, New Delhi
- Wadia, D.N. (1919). Geology of India. London: Macmillan & Co. Ltd.
- Dutta, R., and Sundaram, K. P. M. (1999). Indian Economy. S. Chand and Company Limited, New Delhi
- Galina, S., and Sengupta, P. (1967). Economic Regionalisation of India, Census of India
- Johnson, B. L. C., (ed.) (2001). Geographical Dictionary of India, Vision Books, New Delhi
- Khullar, D. R. (2014). India: A Comprehensive Geography, Kalyani publishers
- Mamoria, C. B. (1996). Economic and Commercial Geography of India. Revised edition, Shival Aggarwala and Co., Agra
- Mandal, R. B. (ed.) (1990). Patterns of Regional Geography – An International Perspective, Vol. 3 – Indian Perspective
- Pathak, C. R. (2003). Spatial Structure and Processes of Development in India. Regional Science Assoc., Kolkata
- Sharma, T. C. (2013). Economic Geography of India. Rawat Publication, Jaipur
- Singh, J. (2003). India - A Comprehensive & Systematic Geography, Gyanodaya Prakashan, Gorakhpur
- Singh, R. L. (1971). India: A Regional Geography, National Geographical Society of India
- Spate, O. H. K., and Learmonth, A. T. A. (1967). India and Pakistan: A General and Regional Geography, Methuen
- Tiwari, R. C. (2007). Geography of India. Prayag Pustak Bhawan, Allahabad

SEMESTER VI

Type: Major

PAPER: IX (Theory)

COURSE CODE: GEOG-M-T-9

COURSE TITLE: GEOGRAPHICAL THOUGHT

Total Marks: 75

Credits: 6

Course Evaluation: Semester End Examination (60 Marks) and Internal Assessment (15 Marks)

Course Objectives:

- To obtain fundamental knowledge of Geographical Thought
- To study the development of Geographical knowledge during ancient and medieval periods
- To study the development of Geography during the Age of Discovery
- To study the development of Geography during the classical period
- To study the development of Modern Geography
- To study the recent development of Geography

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- familiarise with the evolution of Geographical Thought
- understand the fundamental Philosophical basis of Geography
- familiarise with the changing paradigm shift in Geography
- acquire clear knowledge of theoretical and methodological development of Geography

Professional Skill Development Opportunities of the Course:

The acquire knowledge of this course will increase the interest of the learners for further study in the evolution of Geographical Thought. This course will be helpful to the learners in developing critical thinking abilities and analytical skills.

Course Content:

1. Concept of space in Geography: Material space and social space; Spatial process and pattern; Spatial organisation; Spatial relationship; Spatial interaction and spatial integration
2. Contributions of Greek, Roman, Chinese and Indian scholars in the development of geographical knowledge during the ancient period
3. Contributions of Arab Scholars in the development of Geography during the medieval period
4. Transition from Cosmography to Scientific Geography: Contributions of Bernard Varenius and Immanuel Kant
5. Dualism and Dichotomies: Physical and Human Geography; Regional and Systematic Geography; Determinism and Possibilism, Ideographic and Nomothetic
6. Contributions of Alexander von Humboldt and Carl Ritter to the foundation of Modern Geography
7. Contributions of Friedrich Ratzel, Ferdinand von Richthofen, and Alfred Hettner to the foundation of Modern Geography
8. Schools of Geographical thought: French, British and American
9. Evolution of Geographical thought in India since 20th century

10. Positivism and Quantitative Revolution in Geography
11. Critical Revolution in Geography, Humanistic, Behaviourial, Radical and Welfare approaches in Geography
12. Feminism and Feminist Geography, Postmodernism and Postmodern Geography

Suggested Readings:

- Adhikari, S., (2015). Fundamentals of Geographical Thought, Orient Blackswan Pvt. Ltd., Hyderabad.
- Dikshit R. D., (1997): Geographical Thought: A Contextual History of Ideas, Prentice– Hall India.
- Hartshorne, R., (1939). The Nature of Geography: A Critical Survey of Current Thought in the Light of the Past, Association of American Geographers, Washington.
- Hartshorne, R., (1959). Perspective on the Nature of Geography, Association of American Geographers, Washington.
- Harvey, D., (1969). Explanation in Geography, Edward Arnold, London.
- Hussain, M., (2015). Evolution of Geographical Thought, sixth edition, Rawat Publications, Jaipur.
- Johnston, R. J., and Sidaway, J. D., (2004). Geography & Geographers: Anglo-American Human Geography since 1945, sixth edition, Arnold, London.
- Johnston, R.J., Gregory, D., Pratt, G. and Watts, M. (eds), (2000). The Dictionary of Human Geography, fourth edition, Blackwell Publishers, New Jersey.
- Moss, P.(ed), (2002). Feminist Geography in Practice: Research and Methods, Wiley-Blackwell, New Jersey.
- Peet, R., (1998). Modern Geographical Thought, Wiley, New Jersey.
- Smith, D. M., (1977). Human geography: a welfare approach, Edward Arnold, London.
- Soja, E.W., (1989). Postmodern Geographies: The Reassertion of Space in Critical Social Theory, Verso, London.

SEMESTER VI

Type: Major

PAPER: X (Practical)

COURSE CODE: GEOG-M-P-10

COURSE TITLE: QUANTITATIVE TECHNIQUES IN GEOGRAPHY

Total Marks: 75

Credits: 6

Course Evaluation: Semester End Examination (50+10* = 60 Marks) and Internal Assessment (15 Marks)

***Laboratory Note Book + Viva-voce: 5+5 = 10**

Course Objectives:

- To develop practical knowledge in applying quantitative techniques in Geography
- To develop ability, skills and expertise in data tabulation, data analysis and interpretation
- To enhance ability in graphical presentation of Geographical data
- To develop ability to solve Geographic questions using quantitative techniques

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- acquire practical knowledge and skills in the application of quantitative techniques in Geography
- Enhance ability and skills in tabulation, analysis and interpretation of Geographical data
- acquire knowledge and skills in graphical presentation of Geographical data
- develop expertise in quantitative analysis of Geographical issues

Professional Skill Development Opportunities of the Course:

The course will be effective to build basic foundation of the learners for further studies and research in the application of quantitative techniques to solve Geographic questions. This course will be highly efficient to enhance data analysis skills, analytical skills, spatial analysis skills, critical thinking skills, observational skills and data visualisation skills. This course offers employment opportunities.

Course Content:

1. Nature and classification of data: Discrete and Continuous Data; Spatial and Non-spatial data, Population and Samples; Scales of Measurement: Nominal, Ordinal, Interval and Ratio; Sources of Data
2. Tabulation and Formation of Statistical Tables and Graphical Representation: Histogram, Frequency Polygon, Frequency Curve and Ogives
3. Measures of Central Tendency: Mean, Median and Mode
4. Measures of Dispersion: Mean Deviation, Standard Deviation and Coefficient of Variation
5. Concept of Probability and Normal Distribution, Skewness (Pearson's method); Z-score
6. Sampling: Sampling plans for spatial and non-spatial data, sampling distributions, sampling estimates for large and small samples tests involving means and proportions
7. Correlation and Regression Analysis: Rank Correlation and Product Moment Correlation; Scatter Diagram and Linear Regression using Least Square method, Residuals from Regression
8. Time Series Analysis: Time Series Components, Moving Mean method, Least Square method

Suggested Readings:

- Alvi, Z., (2002). *Statistical Geography: Methods & Applications*, Rawat Publications, Jaipur.
- Dadson, S.J., (2017). *Statistical Analysis of Geographical Data: An Introduction*, John Wiley & Sons Ltd., Sussex.
- Das, N. G., (2017). *Statistical Methods (combined volumes)* McGraw Hill Education.
- Mahmood, A., (1999). *Statistical Methods in Geographical Studies*, Rajesh Publications, Delhi.
- McCarroll, D. (2017). *Simple Statistical Tests for Geography*, CRC Press, Taylor & Francis Group, Florida.
- Pal, S.K., (1998). *Statistics for Geoscientists: Techniques and Applications*, Concept publishing Company, New Delhi.
- Robinson, G.M., (1998). *Methods and Techniques in Human Geography*, John Wiley & Sons Ltd., New Jersey.
- Rogerson, P., (2001). *Statistical Methods for Geography*, Sage Publications Ltd., London.
- Silk, J., (1979). *Statistical Concepts in Geography*, George Allen & Unwin, London.
- Spiegel, M. R. and Stephens, L.J., (2017). *Schaum's Outline of Statistics*, McGraw-Hill.
- Walford, N., (1995). *Geographical Data Analysis*, John Wiley & Sons, Chichester.

SEMESTER VII

Type: Major

PAPER: XII (Theory)

COURSE CODE: GEOG-M-T-12

COURSE TITLE: GEOGRAPHY OF ENVIRONMENTAL ISSUES

Total Marks: 75

Credits: 6

Course Evaluation: Semester End Examination (60 Marks) and Internal Assessment (15 Marks)

Course Objectives:

- To obtain fundamental knowledge of Geography of environmental issues
- To study relevant terms, approaches and concepts in environmental issues in Geography
- To understand the basic ideas of environmental issues and management
- To study the basic ideas of human-environment relationship
- To understand the environmental movement
- To understand sustainable development

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- understand fundamental knowledge in Geography of environmental issues
- obtain knowledge on the approaches and concepts in Environmental Geography
- acquire basic knowledge of environmental issues and management strategies
- obtain basic ideas of human-environment relationship
- acquire basic ideas of environmental movement

Professional Skill Development Opportunities of the Course:

The obtained knowledge of this course will increase the interest of the learners for further study in Environmental Geography particularly in the fields of environmental issues and management. This course will help the learners in developing analytical skills, observational skills and critical thinking abilities.

Course Content:

1. Nature, scope and content of Environmental Studies in Geography
2. Concept of resource-population relationship
3. Types and significance of worldwide contemporary major environmental issues
4. Concept of ecological foot print; Concept of environmental migration
5. Concept of sustainable development and Sustainable Development Goals
6. Role of IUCN, UNDP, UNEP, IPCC and UNFCCC
7. Concept of participatory management of forest: Agro forestry, Social forestry and JFM
8. Wildlife conservation and management: Sanctuaries, National Parks and Biosphere Reserves w.r.t. India
9. Dams and development – displacement and rehabilitation issues
10. Environmental implications of River Linking Project
11. Tourism industry and environment: issues and challenges
12. Environmental movements in India with special reference to Chipko, Silent Valley

Suggested Readings:

- Casper, J.K. (2010). *Changing Ecosystems: Effects of Global Warming*. Infobase Pub. New York.
- Chandna, R. C. (2002). *Environmental Geography*. Kalyani, Ludhiana.
- Cunningham, W. P. and Cunningham, M. A. (2004). *Principals of Environmental Science: Inquiry and Applications*. Tata Macgraw Hill, New Delhi.
- Goudie, A. (2001). *The Nature of the Environment*. Blackwell, Oxford.
- Miller, G. T. (2004). *Environmental Science: Working with the Earth*. Thomson Brooks Cole, Singapore.
- Odum, E. P. et al, (2005). *Fundamentals of Ecology*. Ceneage Learning India.
- Singh, R.B. (1998). *Ecological Techniques and Approaches to Vulnerable Environment*. New Delhi, Oxford & IBH Pub.
- Singh, R.B. (Eds.) (2009). *Biogeography and Biodiversity*. Rawat Publication, Jaipur.
- Singh, R.B. and Hietala, R. (Eds.) (2014). *Livelihood security in Northwestern Himalaya: Case studies from changing socio-economic environments in Himachal Pradesh, India*. *Advances in Geographical and Environmental Studies*, Springer.
- Singh, S. (1997). *Environmental Geography*. Prayag Pustak Bhawan. Allahabad.
- UNEP (2007). *Global Environment Outlook: GEO4: Environment for Development*, United Nations Environment Programme.
- Wright, R. T. and Boorse, D. F. (2010). *Toward a Sustainable Future*, PHI Learning Pvt Ltd, New Delhi.

SEMESTER VII

Type: Major

PAPER: XIII (Theory)

COURSE CODE: GEOG-M-T-13

COURSE TITLE: SOCIAL AND CULTURAL GEOGRAPHY

Total Marks: 75

Credits: 6

Course Evaluation: Semester End Examination (60 Marks) and Internal Assessment (15 Marks)

Course Objectives:

- To introduce the fundamental knowledge of Social and Cultural Geography and their different dimensions
- To explain the social theories and approaches to cultural processes and typologies
- To make aware about the problem-solving approaches of Social and Cultural Geography to social pathology and cultural identity
- To evaluate development of social and cultural policies and programmes in India

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- connect social theories with geographical phenomena
- get a geographical perspective of social and cultural phenomena, including social and cultural ecology
- evaluate the problems of social and cultural arena practically
- understand the nature and development of technology and its impact on culture

Professional Skill Development Opportunities of the Course:

This course will help the learners in developing analytical skills, observational skills and critical thinking abilities:

- Students will be able to analyze social and cultural processes theoretically and contribute to policy design.
- The acquire knowledge will help the learners to build better foundation for further studies and research in Social and Cultural Geography
- Students will be skilled in employing the modern techniques of GIS to evaluate socio-cultural problems with reference to India
- Students will be skilled in handling the syllabus for All India basis competitive exams.

Course Content:

UNIT I: SOCIAL GEOGRAPHY

1. Social Geography: Nature, scope and content
2. Social processes and spatial form: conceptual framework; Elements of social structure: Caste, class, religion, race
3. Concept of space: Place, space and locale
4. Social Pathology: Crime and violence; Social inclusion and exclusion
5. Social Impact Assessment (SIA): Concept and importance
6. Social Planning: Constitutional provisions and inclusive growth

UNIT II: CULTURAL GEOGRAPHY

1. Definition, scope and content of Cultural Geography; Development of cultural geography
2. Role of technology for the evolution of culture
3. Cultural hearth and realm; Cultural diffusion: process and types
4. Popular cultures, folk culture and its revival; Concept of cultural landscape and cultural ecology
5. India and its multicultural identity: Language, religion and customs
6. Migration and Diaspora; Indian Diaspora in USA

Suggested Readings:

- Ahmed A. (1999). Social Geography, Rawat Publications.
- Banerjee Guha, S. (Ed.) (2004). Space, Society & Geography, Rawat Publication, Delhi
- Bardhan, P. (2003). Poverty, age structure & Political Economy in India, Oxford University Press
- Casino V. J. D., Jr. (2009). Social Geography: A Critical Introduction, Wiley Blackwell.
- Cater J. and Jones T. (2000). Social Geography: An Introduction to Contemporary Issues, Hodder Arnold.
- Dohrs, I., Sommers, L. (1967). Cultural Geography. Thomas Crowell Company
- Fellmann, J.D., Getis, A., Getis, J. (2000). Human Geography-Landscape of Human Activity, McGraw Hill
- Jones, E. and Eyles, J. (1977). An Introduction to Social Geography, Oxford University Press, Oxford.
- Jones, E.(Ed.), (1975). Readings in Social Geography, Oxford University Press, Oxford.
- Holt L. (2011). Geographies of Children, Youth and Families: An International Perspective, Taylor & Francis.
- Mitchell, D.(2000). Cultural Geography: A Critical Introduction, Wiley-Blackwell, New Jersey
- Panelli R., (2004). Social Geographies: From Difference to Action, Sage.
- Rachel P., Burke M., Fuller D., Gough J., Macfarlane R. and Mowl G., (2001). Introducing Social Geographies, Oxford University Press.
- Smith D. M.(1977). Human geography: A Welfare Approach, Edward Arnold, London.
- Smith D. M.(1994). Geography and Social Justice, Blackwell, Oxford.
- Sopher, D.(1980). An Exploration of India, Cornell University Press, Ithasa
- Valentine G.(2001). Social Geographies: Space and Society, Prentice Hall

SEMESTER VII

Type: Major

PAPER: XIV (Practical)

COURSE CODE: GEOG-M-P-14

COURSE TITLE: ADVANCED REMOTE SENSING AND GIS

Total Marks: 75

Credits: 6

Course Evaluation: Semester End Examination (50+10* = 60 Marks) and Internal Assessment (15 Marks)

***Laboratory Note Book + Viva-voce: 5+5 = 10**

Course Objectives:

- To develop practical knowledge in applying advanced remote sensing and GIS techniques
- To develop ability, skills and expertise in data collection, tabulation, data analysis and interpretation
- Apply principles of Remote sensing and GIS to collect map and retrieve spatial information
- To enhance ability in georeferencing, digitization and preparation of annotated thematic maps and presentation of Geographical data
- Use geospatial tools and techniques for hazard mitigation and environmental planning
- To provide skills and expertise in remote sensing and GIS applications to solve geographical questions

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- acquire practical knowledge and skills in the application of advanced remote sensing and GIS techniques in Geography
- enhance ability and skills in data collection, tabulation, analysis and interpretation of Geographical data
- develop skills in georeferencing, digitization and preparation of annotated thematic maps
- develop expertise in digital image processing and image interpretation
- acquire skills to solve geographical questions using remote sensing and GIS
- develop expertise in mapping of Geographical issues

Professional Skill Development Opportunities of the Course:

This course has the great potential to advance the learner's career. This course is highly effective to develop digital data analysis skills, observation skills, technical skills. This course has a wide variety of employment opportunities.

Course Content

1. Visual Aerial Photograph interpretation: Identification and delineation of physical and cultural features with stereoscope
2. Visual image interpretation: Identification and delineation of physical and cultural features from satellite images
3. Georeferencing of maps and images; Features digitization from topographical sheets, Google Earth images and other maps
4. Radiometric correction of satellite data

5. Image classification (un-supervised and supervised)
6. Preparation and interpretation of hazard maps applying Geoinformatics: Flood, cyclone and land slide
7. Mapping of spatial and temporal variations of land use and land cover applying Geoinformatics with special reference to forest, water bodies, agriculture and settlement
8. Terrain analysis using Digital Elevation Model: Relief, slope, aspect, contour; Extraction of drainage from DEM

[Note: Using Q-GIS (open access) software]

***A Project File of exercises consisting of each theme is to be submitted**

Suggested Readings:

- Bhatta, B.(2021). Remote Sensing and GIS. 3rded, OUP India.
- Bolstad, P.(2016). GIS Fundamentals: A First Text on Geographic Information Systems. 5thed, XanEdu Publishing Inc.
- Brewer, C.A.(2015). Designing Better Maps: A Guide for GIS Users. 2nded, Esri Press.
- Campbell, J. B. and Wynne, R. H.(2011). Introduction to Remote Sensing. 5thed, Guildford Press.
- Chang, K-t.(2017). Introduction to Geographical Information System. 4thed, McGraw-Hill Education.
- Harvey, F.(2015). A Primer of GIS: Fundamental Geographic and Cartographic Concepts. 2nded, The Guilford Press.
- Jensen, J.R.(2013). Remote Sensing of the Environment: An Earth Resource Perspective. Pearson Education India.
- Joseph, G. and Jegannathan, C.(2018). Fundamentals of Remote Sensing. 3rd ed, The Orient Blackswan.
- Lillesand, T.M., Kiefer, R.W., Chipman, J.W. (2015). Remote Sensing and Image Interpretation. 7thed, Wiley.

SEMESTER VII

Type: Minor

PAPER: IV (Theory)

COURSE CODE: GEOG-MI-T-4

COURSE TITLE: GEOGRAPHY OF ENVIRONMENT

Total Marks: 50

Credits: 4

Course Evaluation: Semester End Examination (40 Marks) and Internal Assessment (10 Marks)

Course Objectives:

- To obtain fundamental knowledge of Geography of Environment
- To study relevant terms, approaches and concepts in Environmental Geography
- To understand the basic ideas of environment
- To study the environmental issues and management
- To study the basic ideas of human-environment relationship
- To understand sustainable development

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- understand fundamental knowledge in Geography of Environment
- obtain knowledge on the approaches and concepts in Environmental Geography
- understand fundamental knowledge of the structure and function of ecosystem
- acquire basic knowledge of environmental issues and management strategies
- obtain basic ideas of human-environment relationship

Professional Skill Development Opportunities of the Course:

The obtained knowledge of this course will increase the interest of the learners for further study in Environmental Geography particularly in the fields of environmental issues and management. This course will help the learners in developing analytical skills, observational skills and critical thinking abilities.

Course Content:

1. Concepts and approaches of Environmental Geography
2. Concept, structure and functions of Ecosystem
3. Environmental pollution and degradation: Land, water and air
4. Wetlands: Ramsar sites in India
5. Wildlife conservation and management: Sanctuaries, national parks and biosphere reserves w.r.t. India
6. Plastic hazard: Causes, consequences and management
7. Arsenic contaminations in Deltaic Bengal
8. Human-environment relationship in mountain and coastal regions
9. Sustainable Regional Development: Needs and significances
10. Environmental Impact Assessment

Suggested Readings:

- Casper, J.K. (2010). *Changing Ecosystems: Effects of Global Warming*. Infobase Pub. New York.
- Chandna, R. C. (2002). *Environmental Geography*. Kalyani, Ludhiana.
- Cunningham, W. P. and Cunningham, M. A. (2004). *Principals of Environmental Science: Inquiry and Applications*. Tata Macgraw Hill, New Delhi.
- Goudie, A. (2001). *The Nature of the Environment*. Blackwell, Oxford.
- Miller, G. T. (2004). *Environmental Science: Working with the Earth*. Thomson Brooks Cole, Singapore.
- Odum, E. P. et al, (2005). *Fundamentals of Ecology*. Ceneage Learning India.
- Singh, R.B. (1998). *Ecological Techniques and Approaches to Vulnerable Environment*. New Delhi, Oxford & IBH Pub.
- Singh, R.B. (Eds.) (2009). *Biogeography and Biodiversity*. Rawat Publication, Jaipur.
- Singh, S. (1997). *Environmental Geography*. Prayag Pustak Bhawan. Allahabad.
- Wright, R. T. and Boorse, D. F. (2010). *Toward a Sustainable Future*, PHI Learning Pvt Ltd, New Delhi.

SEMESTER VIII

Type: Major

PAPER: XV (Theory)

COURSE CODE: GEOG-M-T-15

COURSE TITLE: REGIONAL PLANNING AND DEVELOPMENT

Total Marks: 50

Credits: 4

Course Evaluation: Semester End Examination (40 Marks) and Internal Assessment (10 Marks)

Course Objectives:

- To introduce the fundamental knowledge of Regional Planning and Development and its different dimensions
- To explain the theories and approaches to regional planning and development
- To make aware about the problem-solving approaches of Geography to regional planning and development
- To evaluate regional development in India

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- acquire clear knowledge on region, regionalisation and regional planning
- connect regional theories with geographical phenomena
- get a geographical perspective of regional phenomena
- evaluate the problems of region and policy formulation
- understand the nature and development of human resource

Professional Skill Development Opportunities of the Course:

This course will help the learners in developing analytical skills, observational skills and critical thinking abilities:

- Students will be able to analyze regional development theoretically and contribute to policy design.
- The acquire knowledge will help the learners to build better foundation for further studies and research in planning and development of region
- Students will be skilled in employing the modern techniques of GIS to evaluate regional problems with reference to India
- Students will be skilled in handling the syllabus for All India basis competitive exams.

Course Content:

UNIT I: REGIONAL PLANNING

1. Concept of region; Type and delineation: Formal, functional and planning regions
2. Types of planning; Principles and techniques of regional planning
3. Needs of regional planning, multi level planning in India
4. Concept of metropolitan and urban agglomerations; Metropolitan planning: NCR, KMDA
5. Regionalisation of India for planning (Agro-Ecological Zones)

UNIT II: REGIONAL DEVELOPMENT

1. Development: Meaning, growth versus development; Changing concept of development; Concept of underdevelopment
2. Theories and models for regional development: Growth pole model of Perroux; Growth foci model in Indian context (R.P. Misra)
3. Theories and models for regional development: Cumulative causation (Myrdal), core periphery (Hirschman, Rostow and Friedman)
4. Concept and indicators of regional imbalances in India; Significance of balanced development in India
5. Human development: Significance, indicators and measurement

Suggested Readings:

- Berry, B.J.L. and Horton, F.F. (1970). *Geographic Perspectives on Urban Systems*. Prentice Hall, New Jersey.
- Bhat L.S. (1972). *Regional Planning in India*, Statistical Publishing Society
- Blij H. J. De, (1971). *Geography: Regions and Concepts*, John Wiley and Sons.
- Chand, M and Puri V.K. (1983). *Regional planning in India*, allied publishers, New Delhi
- Claval, P. (1998). *An Introduction to Regional Geography*, Blackwell Publishers, Oxford and Massachusetts.
- Dickinson, R.E. (1964). *City and region*, Rutledge, London.
- Datta, R. and Sundaraman, K.P.M.(2018). *Indian Economy*, S. Chand, India.
- Friedmann J. and Alonso W. (1975). *Regional Policy - Readings in Theory and Applications*, MIT Press, Massachusetts.
- Gore C. G. (1984). *Regions in Question: Space, Development Theory and Regional Policy*, Methuen, London

SEMESTER VIII

Type: Major

PAPER: XVI (Theory)

COURSE CODE: GEOG-M-T-16

COURSE TITLE: RESEARCH METHODOLOGY

Total Marks: 50

Credits: 4

Course Evaluation: Semester End Examination (40 Marks) and Internal Assessment (10 Marks)

Course Objectives:

- To acquire fundamental knowledge of research methodology in Geography
- To study the approaches and perspectives of research in Geography
- To obtain knowledge about literature review and formulating research gap
- To acquire knowledge in formulating research gap
- To study research integrity and plagiarism
- To study the structure of research report
- To acquire knowledge in referencing and preparation of bibliography

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- obtain fundamental knowledge of methodology in Geographical research
- understand the fundamental ideas about approaches and perspectives of Geographical research
- acquire knowledge about literature review and formulating research gap
- understand in formulating research gap
- familiarise with research integrity and plagiarism
- acquire knowledge in preparing research report

Professional Skill Development Opportunities of the Course:

The acquire knowledge of this course will increase the interest of the learners for further study in the changing trends and perspectives of research methodology in Geography. This course will be helpful to the learners in developing critical thinking abilities and analytical skills. This course also offers employment opportunities.

Course Content:

1. Research in Geography: Meaning, types and significance
2. Approaches and perspectives of Geographical Research: Inductive and Deductive; Objective and Subjective; Quantitative and Qualitative
3. Significance of literature review and identification of research gap
4. Formulation of research design
5. Defining research problem, objectives and hypothesis; Research materials and methods
6. Preparation of Survey Questionnaire and Schedule
7. Methods of Sampling; Sample Size and Sample Design
8. Research Ethics with special reference to Plagiarism
9. Structure of research report: Title, Acknowledgement, Abstract and Keywords, Introduction, Literature Survey, Methodology, Results and Discussion and Conclusion
10. Referencing style and preparation of Bibliography (APA style)

Suggested Readings:

- Ahuja, R., (2001). Research Methods, Rawat Publications, Jaipur.
- Das, D. K. L, (2000). Practice of Social Research, Rawat Publications, Jaipur.
- Ford, E.D., (2000). Scientific Method for Ecological Research, Cambridge University Press, Cambridge.
- Gibaldi, J. and Aichert, W. S.,(1989). MLA handbook for writers of research papers, Affiliated East West Press Pvt., Ltd., New Delhi.
- Harper, C., and Marcus, R., (2007). Research for Development: A practical Guide, Vistaar Publication, New Delhi.
- Kothari, C. R., (2019). Research Methodology: Methods and Techniques, 4th edition, New Age International Publishers, New Delhi.
- Kothari, C.R., (2013). Quantitative Techniques, Vikas Publishing House, Noida.
- Montello, D.R. and Sutton, P.C., (2013). An Introduction to Scientific Research Methods in Geography & Environmental Studies, sage Publication Ltd., London.
- Robinson, G.M., (1998). Methods and Techniques in Human Geography, John Wiley and Sons Ltd., New Jersey.
- Singh, K., (2007). Quantitative Social Research Methods, Sage Publication, New Delhi.
- Somekh, B., and Lewin, C., (2005). Research Methods in the Social Science, Vistaar, New Delhi.

SEMESTER VIII

Type: Major

PAPER: XVII (Practical)

COURSE CODE: GEOG-M-P-17

COURSE TITLE: STATISTICAL TECHNIQUES USING SOFTWARE

Total Marks: 50

Credits: 4

Course Evaluation: Semester End Examination (30+10* = 40 Marks) and Internal Assessment (10 Marks)

***Laboratory Note Book + Viva-voce: 5+5 = 10**

Course Objectives:

- To acquire skills and expertise in applying statistical techniques using software
- To enhance ability and skills in data analysis using software
- To improve expertise in probability, sampling, measures of central tendency and measures of dispersion using software
- To improve expertise in correlation, regression, test of significance and time series analysis using software

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- improve practical knowledge and expertise in applying statistical techniques using software
- improve ability, skills and expertise in in data analysis using software
- acquire knowledge and expertise in probability, sampling, measures of central tendency and measures of dispersion using software
- enhance expertise in correlation, regression, test of significance and time series analysis using software

Professional Skill Development Opportunities of the Course:

The course will help the learners to build basic foundation for further studies and research in applying statistical techniques using software. This course will be highly effective to enhance data analysis skills, analytical skills, spatial analysis skills, observational skills and data visualisation skills. This course also offers employment opportunities.

Course Content:

1. Differences between Spatial and Non-spatial data; Tabulation and formation of statistical tables
2. Sampling: Sampling plans for spatial and non-spatial data, sampling distributions
3. Correlation and Regression Analysis: Rank correlation and Product Moment correlation
4. Regression: Residuals from regression, Exponential regression
5. Hypothesis testing: Null and Alternative hypotheses, Level of significance, Type-I and II errors
6. Test of Significance: Student's t-test and Chi-square test
7. Time Series Analysis: Time series components, Least Squares method

[Note: Any statistical software package may be used for practice]

***A Project File of exercises consisting of each theme is to be submitted**

Suggested Readings:

- Alvi, Z., (2002). *Statistical Geography: Methods & Applications*, Rawat Publications, Jaipur.
- Dadson, S.J., (2017). *Statistical Analysis of Geographical Data: An Introduction*, John Wiley & Sons Ltd., Sussex.
- Das, N. G., (2017). *Statistical Methods (combined volumes)* McGraw Hill Education.
- Mahmood, A., (1999). *Statistical Methods in Geographical Studies*, Rajesh Publications, Delhi.
- McCarroll, D. (2017). *Simple Statistical Tests for Geography*, CRC Press, Taylor & Francis Group, Florida.
- Pal, S.K., (1998). *Statistics for Geoscientists: Techniques and Applications*, Concept publishing Company, New Delhi.
- Robinson, G.M., (1998). *Methods and Techniques in Human Geography*, John Wiley & Sons Ltd., New Jersey.
- Rogerson, P., (2001). *Statistical Methods for Geography*, Sage Publications Ltd., London.
- Silk, J., (1979). *Statistical Concepts in Geography*, George Allen & Unwin, London.
- Spiegel, M. R. and Stephens, L.J., (2017). *Schaum's Outline of Statistics*, McGraw-Hill.
- Walford, N., (1995). *Geographical Data Analysis*, John Wiley & Sons, Chichester.

SEMESTER VIII

Type: Major

PAPER: XVIII (Theory)

COURSE CODE: GEOG-M-T-18

COURSE TITLE: POLITICAL GEOGRAPHY AND CONTEMPORARY ISSUES IN GEOPOLITICS

Total Marks: 75

Credits: 6

Course Evaluation: Semester End Examination (60 Marks) and Internal Assessment (15 Marks)

Course Objectives:

- To develop fundamental knowledge in Political Geography
- To study the basic concept of State
- To study the concept of core-periphery and basic idea of Electoral Geography
- To develop knowledge in geopolitics and study contemporary issues in geopolitics

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- To obtain fundamental knowledge of Political Geography
- To acquire basic concept and formation of state
- To obtain knowledge about core periphery concept and electoral geography
- To acquire knowledge in contemporary issues in geopolitics and geostrategic views

Professional Skill Development Opportunities of the Course:

The course will be effective to build basic foundation of the learners for further studies and research in Political Geography and geopolitics. This course will be highly beneficial to enhance critical thinking skills, analytical skills and observational skills.

Course Content:

UNIT I: POLITICAL GEOGRAPHY

1. Nature, scope and approaches of Political Geography
2. Boundaries, Frontiers and Buffer-Zones; Elements and types of States; Concept of Nation-State
3. Heartland and Rimland theories
4. Concept of State after Ratzel and Marx
5. Core-periphery concept: Colonialism, Imperialism and Federalism
6. Concept of Electoral Geography; Approaches to the study of electoral politics: Spatial and behavioural approaches

UNIT II: CONTEMPORARY ISSUES IN GEOPOLITICS

1. Concept of Geopolitics; Application of tools in Geopolitics (maps, propaganda, perception and strategy)
2. Politico-economic Blocs: SAARC, EU, NATO, OPEC and BRICS
3. Geopolitical significance of international water disputes: India and its neighbouring countries
4. Geopolitics of petroleum
5. Geopolitics of South Asia, South-East Asia and Middle East
6. Geopolitics of global trade

Suggested Readings:

- Adhikari, S. (1997). Political Geography, Rawat Publication.
- Agnew, J.A. (1997). Political Geography: A Reader, Arnold, London.
- Cohen, S.B. (2003). Geopolitics of the world system, Rowman& Littlefield Publishers.
- Cohn, S.B. (2003). Geopolitics of the World System, Lanham.
- Dikshit, R.D. (1982). Political Geography: A Contemporary Perspective, Tata McGraw Hill.
- Jones, M., Jones, R., & Woods, R. (2004). An Introduction to Political Geography: Space, Place and Politics, Routledge.
- Muir, R. (1997). Political Geography: A New Introduction, Bloomsbury Publishing.
- Peet, R. (1998). Modern Political Thought, Blackwell, Oxford.
- Pounds, N.J.G. (1963). Political Geography, McGraw-Hill, New York.

SEMESTER VIII

Type: Major

PAPER: XIX (Theory)

COURSE CODE: GEOG-M-T-19

COURSE TITLE: WELFARE GEOGRAPHY

Total Marks: 75

Credits: 6

Course Evaluation: Semester End Examination (60 Marks) and Internal Assessment (15 Marks)

Course Objectives:

- To introduce the fundamental knowledge of Welfare Geography and its development
- To explain the theories and approaches to welfare processes and typologies
- To make aware about the problem-solving approaches of Welfare Geography to human welfare
- To study deprivation in economic and social field from different perspective viz, wealth, education, health, gender etc.

Course Learning Outcomes:

After the completion of course, the learners will have ability to:

- connect welfare theories with geographical phenomena
- evaluate the deprivation, discrimination, exclusion from different perspectives
- get a geographical perspective of human problems and welfare, including poverty eradication, HDI, GEM, GHI
- acquire clear knowledge on programmes, policies and schemes of welfare with reference to India

Professional Skill Development Opportunities of the Course:

This course will help the learners in developing analytical skills, observational skills and critical thinking abilities:

- Students will be able to analyze welfare approaches theoretically and contribute to policy design.
- The acquire knowledge will help the learners to build better foundation for further studies and research in Welfare Geography.
- Students will be skilled in employing the modern techniques of GIS to evaluate problems and welfare approaches with reference to India
- Students will be skilled in handling the syllabus for All India basis competitive exams.

Course Content:

1. Welfare Geography and Social Well Being: Concept, approaches and development
2. Geography of development and political economy
3. Concept of deprivation and poverty; Measures and factors of spatial variation of poverty in India
4. Social deprivation: Education and health with reference to India
5. Marginalisation and differential participation in development in India: Gender perspectives
6. Dimension of food security: Food availability, affordability and accessibility, malnutrition and its measures; Nutritional security in India
7. Economic development and labour welfare in India
8. Concept of Quality of Life; Indicators of Social Well-being after Knox and Smith
9. Social welfare schemes in India: Sarva Shiksha Abhiyan (SSA) and National Rural Health Mission (NRHM)

10. Concept of HDI, GEM and their measures
11. Global Hunger Index: Measures and spatial variations at global scale
12. Economic development and ecological crisis

Suggested Readings:

- Bardhan, P. (2003): Poverty, age structure & Political Economy in India, Oxford University Press
- Coates, B.E., Johnston, R.J., and Knox, P.L. (1977), *Geography and Inequality*, Oxford University Press, Toronto
- Harvey, D. (1973), *Social Justice and the City*, Johns Hopkins University Press, Baltimore
- Fellmann, J.D. Getis, A., Getis, J., (2000). Human Geography-Landscape of Human Activity, McGraw Hill
- Knox, P. L. (1976). Social Priorities for Social Indicators: A Survey Approach (Occasional Paper No. 4, Department of Geography, University of Dundee)
- Runciman, W.G. (1966). Relative Deprivation and Social Justice, Routledge and Kegan Paul, London
- Smith D. M. (1977). Human geography: A Welfare Approach, Edward Arnold, London.
- Smith D. M. (1994: Geography and Social Justice, Blackwell, Oxford.
- Sopher, D. (1980). An Exploration of India, Cornell University Press, Ithasa
- Peck, J. (2001). Neoliberalizing states: thinpolicies/hard outcomes, Progress in Human Geography 25(3) pp. 445–455