दक्षिण बिहार केंद्रीय विश्वविद्यालय
CENTRAL UNIVERSITY OF SOUTH BIHAR

FIVE-YEAR INTEGRATED BACHELOR'S – MASTER'S DEGREE PROGRAMME (GEOGRAPHY)

COURSE STRUCTURE AND SYLLABUS

w.e.f. ACADEMIC SESSION 2024-25

PREPARED IN THE LIGHT OF NATIONAL EDUCATION POLICY-2020

भूगोल विभाग

DEPARTMENT OF GEOGRAPHY

भू-जैव एवं पर्यावरण विज्ञान विद्यापीठ

SCHOOL OF EARTH, BIOLOGICAL AND ENVIRONMENTAL SCIENCES

FIVE-YEAR INTEGRATED UG-PG PROGRAMME IN GEOGRAPHY

BOARD OF STUDIES

DEPARTMENT OF GEOGRAPHY

The Hon'ble Vice Chancellor, Central University of South Bihar (CUSB) has reconstituted the Board of Studies of the Department of Geography, School of Earth, Biological and Environmental Sciences (SEBES), CUSB as perstatute 16 (2) of the University vide in partial modification of CUSB notification No. CUSB/Acad/929/ dt. 23.08.2022. In pursuance of ordinance (CUSB/Acad/1-1/2023/AE7419) and under the guidance of Prof. Kameshwar Nath Singh, Hon'ble Vice-Chancellor, CUSB, Gaya, the Board of Studies (BoS) meeting was held on 07th April, 2024 to discuss and to approve the programme structure and course syllabus of the Five-Year Integrated UG-PG Programme in Geography. The structure has been framed as per the recommendations of ICSSR sponsored National Workshop entitled 'National Education Policy 2020: Model Curriculum and Content in Geography' jointly organized by CUSB and Vidya Bharati Uchcha Shiksha Sansthan (VBUSS). The following members were present in the BoS meeting:

S. N.	Name	Address	Position
1.	Prof. Kiran Kumari	Head, Department of Geography, Central University of South Bihar (CUSB)	Chairperson
2.	Prof. Narendra Kumar Rana	Department of Geography, Banaras Hindu University, Varanasi	External Member
3.	Prof. Koppella Narayana Prudhvi Raju	Former Head, Department of Geography, Banaras Hindu University, Varanasi	Special Invitee Member
4.	Prof. Pradhan Parth Sarthi	Head, Dept of Environment Sciences, Dean, School of Earth, Biological and Environmental Sciences, CUSB	Cognate Member
5.	Dr. Tarun Kumar Tyagi	Assistant Professor Department of Teacher Education, CUSB	Special Invitee Member
6.	Dr. Sunita Singh	Assistant Professor, Department of Geography, CUSB	Member
7.	Dr. Jogindar Singh Chauhan	Assistant Professor, Department of Geography, CUSB	Member
8.	Dr. Somnath Bera	Assistant Professor, Department of Geography, CUSB	Member

CONCEPT NOTE ABOUT THE PROGRAMME

The National Education Policy-2020 envisions to give the students a holistic understanding of the Geography, putting equal weightage to the core content and techniques used in Geography. The Department envisions to be the leading Department of Geography in the country by attaining excellence in teaching, learning and research activities in the field of geography.

Keeping employability in mind and in tune with the changing nature of Geography and need of the 21st century, adequate emphasis is rendered on applied aspects of the subject. The Curriculum of Five-Year Integrated B.A./B.Sc.- M.A. /M.Sc. in Geography shall be of five years duration spread over ten semesters. In addition to major courses, minor courses, ability enhancement courses, skill enhancement courses, value-added courses are offered in the programme.

Preface

Geography is a broad discipline which enables to understand the spatial distribution, spatial interrelationship and spatial interaction as well as spatial interdependence on the earth surface with view point to create an ideal spatial organization. The discipline of Geography is a synthesis and multidisciplinary in nature and broadly accepted as a bridge between human and physical sciences.

In the beginning, Geography focused on the physical aspects of the earth but the modern geography is covering all the disciplines that help to understand the earth and its environment. Geography has emerged through time as a transdisciplinary subject integrating the regional diversity with the concepts of dynamic relation between time and space. It also provides the thorough knowledge of transformation of ecology, economy and society from local to global.

In the present context of NEP 2020, the significance and relevance of Geography is axiomatic because of its multidisciplinary and transdisciplinary nature as well as rich philosophical base. It provides us essential tools to analyse and interpret the issues and challenges that arise on earth surface from local to global. With emergence of popular Geospatial technologies such as remote sensing, geographic information system (GIS) and GPS, it has become possible to understand the spatial realities with a view point to frame a conducive and congenial spatial organization for the welfare of economy, society and the nation to achieve the objective of '*Vasudhaiv Kutumbkam*'. These technologies are helpful in various fields, including natural resource management, urban sprawl, climate variations, disaster response, human well-being, and spatial management. It is important for the policy makers and planners to consider the geospatial aspects of the space with references to the location and in the context of the best utilization of public utilities. Geography also plays an important role in understanding diversity in social and

cultural aspects. Therefore, it is a discipline that helps in understanding the region and the country as well as world in past, present and future.

The domain of Geography uses scientific knowledge that includes spatio-temporal analysis, skill development, GIScience, sustainable development and human security. It is essential to focus on the current socio-spatial problems, issues and challenges to make the students aware of the application of geography to sort out the societal upcoming problems. It is also essential to rejuvenate the indigenous geographical knowledge to address the current local and global problems. In the light of exponential changes in the various disciplines, it is to be studied from multidimensional angles.

Introduction

Higher Education is a great edifice that played a significant role in social, economic, and technological development in our country. As per NEP-2020, a more holistic and multidisciplinary comprehensive education will be provided to the students. There is a facility for multiple entry and multiple exits in the programmes so that students can choose programmes as per their interests at different stages of their learning either science or non-science courses. Such a facility would enable students to study and understand the complex multi-pluralist society of the world.

Geography is a multidisciplinary subject that deals with mutual interactions between the physical world and biotic sphere and their spatial variations and distributions. According to Richard Hartshorne "Geography is concerned with the description and explanation of areal differentiation of earth surface". It includes a broad range of branches and sub-branches such as physical geography, human geography, population geography, economic geography, geomorphology, environmental geography, remote sensing, GIS, geospatial sciences and so on.

The Five Year UG-PG Integrated Programme (FYUGPG) in Geography provides a comprehensive linearly progressive learning opportunities to students through practical and theoretical lectures exercises and experiments simultaneously. The Under Graduate and Post Graduate integrated programmes of the Department of Geography, Central University of South Bihar adapted as per the recommendations of NEP 2020, will be for five-year duration, with multiple entry and multiple exit options within the period with the facility to get appropriate certificate--UG Certificate after completion of I & II semesters with 40 credits, UG Diploma after completion of I, II, III & IV semesters with 80 credits, Bachelor Degree after completion of I, II, III, IV, V & VI semesters with 120 credits, Bachelor Degree with Honours/Research after completion of I, II, III, IV, V, VI, VII, & VIII semesters with 160 credits, Master Degree (2yrs) after completion VII, VIII, IX & X semesters with 80 credits, PG Diploma after completion of VII & VIII semesters with 40 credits, Master Degree one year after completion of IX & X semesters with 48 credits. The five years UG-PG integrated programme will provide an opportunity to students to learn and choose major and minor courses as per their interests.

Aims of Five-Year Integrated Programme in Geography:

The aim of the Five-Year UG-PG Integrated Programme in Geography are as follows:

1. The Five-Year Integrated Programme in Geography aims to integrate and bridge the gap between social sciences and natural sciences by adopting approach of interface between classroom and community.
2. To develop systematic, rational and accurate as well as critical analysis ability and capacity among the Graduates about spatial realities.
3. To foster interdisciplinary, multidisciplinary, transdisciplinary as well as holistic view to solve spatial problems and seeking solutions to address the issues.
4. To facilitate and sensitize Graduates about emerging issues of climate change and environment to achieve the Sustainable Development Goals.
5. To provide opportunity for experiential learning and action-oriented research in various branches of Geography through field work, internship, research projects, workshop, seminar and collaboration with faculty and other institutions.
6. To prepare Graduates for diversified career and life learning in public, private and other sectors of the economy by giving opportunity to learn effective communication, mass participation, team spirit, resilience, leadership, and problem-solving approach in societal context.
7. To enable the Graduates for documentation and dissemination of Indian knowledge system in combination with modern technologies to achieve the objective of *"Aatmanirbhar Bharat"* that leads to achieve the goal of *ViksitBharat@2047.*
8. To provide outreach programme and intensive study to Graduates about natural and cultural diversity of Bharat with view point to inculcate the feeling of patriotism for strengthening the national integration.

Programme Learning Outcomes:

A student in the five-year integrated Geography programme is expected to develop ability to:

(i) communicate well the fundamental principles, concepts, and theories across all sub-disciplines of geography, including physical geography, human geography, and practical geography.

(ii) demonstrate multidimensional nature of geographical issues and challenges through an approach of synthesis.

(iii) provide a comprehensive information to help in spatial planning and management.

(iv) develop the ability to think critically and apply analytical skill to interpret geographical phenomena, pattern, and processes.

(v) utilize problem-solving abilities to create inventive and sustainable resolutions for environmental and social challenges.

(vi) revive Indian Knowledge System/ *'Bhartiya Jnana Parampara'* for *"Aatmanirbhar Bharat"* for realising the goals of *Viksit Bharat@2047.*

(vii) in light of National Geospatial technology policy 2022, to introduce contemporary geospatial technologies like remote sensing, GIS, Geoinformatic, and spatial statistics, and their application across diverse geographical themes such as regional planning, urban planning, rural development, disaster management, and environmental planning, aiming for sustainable solutions.

(viii) gain expertise in conducting action-oriented research, encompassing project design, data collection, analysis, and interpretation within the framework of geographical theories and practical applications.

(ix) demonstrate awareness of Bhartiya ethical considerations in geographical research and practices, including respect for cultural diversity, social dignity, and environmental sustainability.

(x) develop effective communication skills to convey geographical concepts, research findings, and analyses to diverse audiences using written, oral, and visual mediums.

(xi) develop communication, coordination and cooperation (*Samvad, Samanvaya and Sahyog*) skills to work in diverse teams, showcasing leadership, to address environmental and social issues effectively.

(xii) promote the dissemination of knowledge and information, exemplary practices, and successful narratives to other communities, organizations, and policymakers in order to encourage adoption and expansion of innovative solutions.

(xiii) demonstrate a global and cultural understanding, acknowledging the diverse cultural, social, and economic contexts in terms of environmental and social issues to realize the goal of '*Vasudhaiva Kutumbakam*'.

(xiv) encourage continuous learning and professional growth and to remain updated on advancements in geographical theory, technology, and practice to adapt to emerging societal and environmental challenges.

4. Teaching Learning Process

The programme is run through varied methods-- pedagogical practices and practical techniques both within and outside classrooms in the field.

- Lectures
- Experiential learning
- Blended mode of learning
- Research-based learning
- Tutorials
- Presentations
- Class participations
- Team work
- Documentary films on related topics
- Assignments/Project Work/Dissertation
- Group discussion and debates
- Seminars/Training/workshops/conferences
- Internship/Field study/Field visit and Report writing
- Laboratory Work/Surveying
- Mentor-Mentee interactions
- Interaction through exchange programme

- Interactions with Social Scientist, Planners and Policy makers, NGO
- Community outreach programme
- Remedial Teaching

5. Teaching Learning Tools

- Cartographic Lab
- Computer Lab with GIS and Remote Sensing software
- Computer Lab with statistics and related software
- GPS
- LCD Monitors
- Projectors
- Smart board, White/Green/Black Board
- Smart Television for Documentary related topics
- Soil and Water Testing Kit
- Identification of Rocks and Minerals
- Surveying and levelling instruments: Total Station, Digital Level, Theodolite, Prismatic Compass, Clinometer, Ground Radar Aperture System (GRAS)
- Toposheets, Aerial photograph and Satellite Imageries, Unmanned Arial Vehicle (UAV) (Drones)
- WLAN

6. Assessment (Assessment of, for and as learning)

- Classroom Attendance
- Class Presentation: Oral/Poster/Power point
- Group Discussions
- Quiz and Assignment
- Viva-voce Examination
- Project Report/Field Report (Surrounding Areas)
- In semester examinations
- End Semester examinations

Course Structure

Five-Year Integrated UG-PG Programme in Geography

SEMESTER-I

SN	Course Code	Course Type	Course Title	Total Credits [20]
1		**Major**	**Physical Geography**	4
2		**Minor***	**Physical Geography**	4
3		**Multidisciplinary****	**Universe and Earth System**	3
4		Ability Enhancement Course (AEC)	**Languages (To be offered by the University)**	2
5		Skill Enhancement Course (SEC)	**Map Reading and Interpretation**	3
6		Value Added Course (VAC)	**Understanding Land and Culture of Bharat**	2
7			**Community Service and Development Programme**	2

**Minor Course for the students of other Discipline who want to opt Geography as Minor Discipline*

**One Minor course of FOUR credits has to be covered by Geography Students offered by other Departments.*

*** Only for the Students of the other Departments*

SEMESTER-II

SN	Course Code	Course Type	Course Title	Total Credits [20]
1		**Major**	**Human Geography**	4
2		**Minor***	**Human Geography**	4
3		**Multidisciplinary****	**Environmental Ethics and Sustainable Development**	3
4		Ability Enhancement Course (AEC)	**Languages (To be offered by the University)**	2
5		Skill Enhancement Course (SEC)	**Map Projections, Weather Map Analysis and Digital Mapping**	3
6		Value Added Course (VAC)	**Geography of Culture and Heritage of Bharat**	2
7			**Yoga Education/NCC/NSS**	2

**Minor Course for the students of other Discipline who want to opt Geography as Minor Discipline*

**One Minor course of FOUR credits has to be covered by Geography Students*

offered by other Departments.
*** Only for the Students of the other Departments***

Students exiting the programme after securing **40 credits** will be awarded **UG CERTIFICATE** in **Basic Geography** provided they secure 4 credits in work based vocational courses offered during summer term or internship / Apprenticeship in addition to 6 credits from skill-based courses earned during first and second semester.

SEMESTER-III

SN	Course Code	Course Type	Course Title	Total Credits [20]
1		**Major**	**Fundamentals of Geomorphology**	4
2		**Major**	**Climatology**	4
3		**Minor***	**Climatology**	4
4		**Multidisciplinary****	**Geography of Indian Ocean Region**	3
5		Ability Enhancement Course (AEC)	**Languages (To be offered by the University)**	2
6		Skill Enhancement Course (SEC)	**Remote Sensing and GIS in Geography**	3

Minor Course for the students of other Discipline who want to opt Geography as Minor Discipline
One Minor course of FOUR credits has to be covered by Geography Students offered by other Departments.
*** Only for the Students of the other Departments***

SEMESTER-IV

SN	Course Code	Course Type	Course Title	Total Credits [20]
1		**Major**	**Bharat: A Comprehensive Systematic Geography**	4
2		**Major**	**Fundamentals of Economic Geography**	4
3		**Major**	**Watershed Management**	4
4		**Major #** **(Either 'a' or 'b')**	**(a) Socio-Economic Survey (Surrounding Areas of the Campus)** **(b) Instrumental Survey**	2
5		**Minor***	**Bharat: A Comprehensive**	4

			Systematic Geography	
6		Ability Enhancement Course (AEC)	**Languages (To be offered by the University)**	2

Minor Course for the students of other Discipline who want to opt Geography as Minor Discipline

One Minor course of FOUR credits has to be covered by Geography Students offered by other Departments.

 # Tutorial/Practical

Students exiting the programme after securing **80 credits** will be awarded **UG DIPLOMA** in **'Geography'** provided they secure 4 credits in work based vocational courses offered during summer term or internship / Apprenticeship (either in first year or second year) in addition to 6 credits fromskill-based courses earned during first and second semester.

SEMESTER-V

SN	Course Code	Course Type	Course Title	Total Credits [20]
1		**Major**	**Fundamentals of Geographical Thought**	4
2		**Major**	**Population Geography**	4
3		**Major**	**Hydrology and Oceanography**	4
4		**Major #**	**Project- Integrated Land and Water Management (Surrounding Areas of the Campus)**	2
5		**Minor***	**Population Geography**	4
6		Internship	**Internship**	2

Minor Course for the students of other Discipline who want to opt Geography as Minor Discipline

One Minor course of FOUR credits has to be covered by Geography Students offered by other Departments.

 # Tutorial/Practical

SEMESTER-VI

SN	Course Code	Course Type	Course Title	Total Credits [20]
1		Major	Regional Geography of World	4
2		Major	Historical Geography of Bharat	4
3		Major	Environment and Sustainable Development	4
4		Major	Statistical Techniques in Geography	4
5		Minor*	Regional Geography of World	4

Minor Course for the students of other Discipline who want to opt Geography as Minor Discipline

One Minor course of FOUR credits has to be covered by Geography Students offered by other Departments.

Students who want to undertake 3-year UG programme will be awarded **B.A. Degree in Geography with a minor in ----------** upon securing **120 credits.**
They are **NOT REQUIRED** to earn 4 credits in work based vocational courses offered during summer term or internship / Apprenticeship

SEMESTER-VII

SN	Course Code	Course Type	Course Title	Total Credits [20]
1		Major	Agricultural Geography	4
2		Major	Disaster Management	4
3		Major	Research Ethics and Methodology	4
4		Major	Urban Geography	4
5		Minor*	Disaster Management	4

Minor Course for the students of other Discipline who want to opt Geography as Minor Discipline

One Minor course of FOUR credits has to be covered by Geography Students offered by other Departments.

SEMESTER-VIII

(For Students having < CGPA 7.5)

SN	Course Code	Course Type	Course Title	Total Credits [20]
1		Major	Spatial Planning and Management	4
2		Major	Political Geography	4
3		Major	Geography of Transport	4
4		Major	Rural Development	4
5		Minor*	Spatial Planning and Management	4

**Minor Course for the students of other Discipline who want to opt Geography as Minor Discipline*

**One Minor course of FOUR credits has to be covered by Geography Students offered by other Departments.*

Students will be awarded UG Degree with Honours in the relevant Discipline /Subject provided they secure **160 credits**

SEMESTER-VIII

(For Students having ≥ CGPA 7.5)

SN	Course Code	Course Type	Course Title	Total Credits [20]
1		Major	Spatial Planning and Management	4
2		Major	Research Project (12 Credits)	4
3		Major		4
4		Major		4
5		Minor*	Geography of Transport	4

**Minor Course for the students of other Discipline who want to opt Geography as Minor Discipline*

**One Minor course of FOUR credits has to be covered by Geography Students offered by other Departments.*

Students will be awarded UG Degree with Honours & Research in the relevant Discipline /Subject provided they secure **160 credits**

One Year PG Programme

Students having Bachelors with Honours in Geography

SEMESTER-IX

SN	Course Code	Course Type	Course Title	Total Credits [20]
1		Major	Advanced Geomorphology	4
2		Major	Advanced Remote Sensing and GIS	4
3		Major	Advanced Statistics for Spatial Analysis	4
4		Major	Demographic Techniques	4
5		Minor*	Demographic Techniques	4

Minor Course for the students of other Discipline who want to opt Geography as Minor Discipline

One Minor course of FOUR credits has to be covered by Geography Students offered by other Departments.

SEMESTER-X

SN	Course Code	Course Type	Course Title	Total Credits [20]
1			Dissertation	20

After completion of Sem-IX and X with 40 credits, students will be awarded PG Degree (One Year) in Geography.

Two Year PG Programme
Students having Bachelor Degree in Geography

SEMESTER-VII

SN	Course Code	Course Type	Course Title	Total Credits [20]
1		Major	Agricultural Geography	4
2		Major	Disaster Management	4
3		Major	Research Ethics and Methodology	4
4		Major	Urban Geography	4
5		Minor*	Disaster Management	4

**Minor Course for the students of other Discipline who want to opt Geography as Minor Discipline*
**One Minor course of FOUR credits has to be covered by Geography Students offered by other Departments.*

SEMESTER-VIII

SN	Course Code	Course Type	Course Title	Total Credits [20]
1		Major	Spatial Planning and Management	4
2		Major	Political Geography	4
3		Major	Geography of Transport	4
4		Major	Rural Development	4
5		Minor*	Spatial Planning and Management	4

**Minor Course for the students of other Discipline who want to opt Geography as Minor Discipline*
**One Minor course of FOUR credits has to be covered by Geography Students offered by other Departments.*

SEMESTER-IX

SN	Course Code	Course Type	Course Title	Total Credits [20]
1		Major	Advanced Geomorphology	4
2		Major	Advanced Remote Sensing and GIS	4
3		Major	Advanced Statistics for Spatial Analysis	4
4		Major	Demographic Techniques	4
5		Minor*	Demographic Techniques	4

Minor Course for the students of other Discipline who want to opt Geography as Minor Discipline

One Minor course of FOUR credits has to be covered by Geography Students offered by other Departments.

SEMESTER-X

SN	Course Code	Course Type	Course Title	Total Credits [20]
1			Dissertation	20

After completion of Sem-VII, VIII, IX and X with 80 credits, students will be awarded PG Degree (Two Year) in Geography.

SEMESTER-I

PHYSICAL GEOGRAPHY

Course Title: Physical Geography	**L**	**T**	**P**	**Cr**
Course Code:	3	1	-	4

Type of Course: Major Course/Minor Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: understand the spirit and purpose of Geography.

CLO2: familiarize with the origin, formation, and development of major landforms on Earth.

CLO3: understand composition and structure of the atmosphere.

CLO4: understand the theories of origin of ocean and ocean basins.

CLO5: gain an in-depth understanding of the physical phenomena and processes of the ocean.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: explain the origin and structure of earth and its movement.

CLO2: explain basic structure and development of major landforms.

CLO3: understand of atmosphere, its composition and its physical properties.

CLO4: understand the physical properties, phenomena and process of the ocean

Unit/Hours	**Content**
Unit I / 15 Hours	Introduction to Geography, Origin of the earth – Modern theories; Interior structure of the earth; Rocks: origin and classification; Earth's movements; folds and fault.
Unit II / 15 Hours	Major landforms: mountains, plateaus and plains; Geomorphic processes: weathering, erosion and deposition; Geomorphic landforms: fluvial, glacier, coastal and wind.
Unit III / 15 Hours	Composition and structure of the atmosphere; Insolation; Temperature: vertical and horizontal distribution; Pressure and pressure belts; Winds: planetary, periodic and local, Climatic regions of world
Unit IV/ 15 Hours	Theories of origin of ocean basin (Tetrahedral); Physical properties of sea water: temperature and salinity; Ocean currents; Tides and Coral reefs.

Suggested/ Recommended readings:

1. Bryant, H. R. (2001). *Physical Geography Made Simple*. Rupa and company. New Delhi.
2. Bunnet, R.B. (2003). *Physical Geography in Diagrams*. Fourth GCSE edition, Pearson Education (Singapore) Private Ltd.
3. Lake, P. (1979). *Physical Geography* (English and Hindi editions). Cambridge University Press.
4. Monkhouse, F.J. (1979). *Physical Geography*. Methuen, London.
5. Singh, M.B. (2001). *Bhoutik Bhugol*. Tara Book Agency, Varanasi.

6. Singh, S. (2003). *Physical Geography*. (English and Hindi editions.) Prayag Pustak Bhawan, Prayagraj.
7. Singh, Jagdish & Singh, K.N. (2009). *Bhoutik Bhugol*. Radha Publication.
8. Strahler, A.N. & Stahler, A.M. (1992). *Modern Physical Geography*. John Wiley and Sons, New York.
9. Trewartha, G.T., Robinson, A.H., Hammond, E.H., & Horn, A.T. (1976/1990). *Fundamentals of Physical Geography*. (3rd ed.) Mac Graw-Hill, New York.
10. Wooldridge, S.W. & Morgan, R.S. (1939). *The Physical Basis of Geography- An Outline of Geomorphology*. Longman, London. Recent edition and Reprint.
11. Wooldridge, S. W., & East, W. G. (1951). *The Spirit and Purpose of Geography: Geography Series*. Hutchinson University Library.

UNIVERSE AND THE EARTH SYSTEM

Course Title: Universe and The Earth System	**L**	**T**	**P**	**Cr**
Course Code:	3	-	-	3
Type of Course: Multidisciplinary Course				
Total Hour: 45 Hours				

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: familiarize with the basic understanding about the universe, galaxy, solar system and the earth.

CLO2: envisage the basic understanding of fundamental concepts and theories related to continent, ocean and life origin.

CLO3: impart knowledge about cosmic abundance of elements of the earth.

CLO4: inculcate the interest of understanding various processes of dynamic earth.

Course Learning Outcomes (CLO): At the completion of the course, the students would be able to:

CLO1: will be having the fair knowledge about origin of universe and the earth system.

CLO2: understand about the atmosphere, hydrosphere, and lithosphere, including their interaction and interrelationships with the biosphere and asthenosphere

CLO3: understand about the cosmic abundance of various elements in the earth

CLO4: understand the dynamic nature of the earth.

Unit/Hours	**Content**
Unit I / 15 Hours	The Universe- Understanding the Universe; Evolution of the Universe, Solar System, Geological Time Scale; Origin of the Earth, Recent Theories, Origin of the Continents and Oceans-Tetrahedral Theory, Wegener Theory and Plate tectonic Theory, Origin of Life
Unit II / 15 Hours	The Earth System- Understanding Earth's System- Lithosphere, Atmosphere, Hydrosphere and Biosphere; Interior Structure of the Earth, Concept of Isostasy - Earth's Movements - Endogenetic forces and Exogenetic forces, Volcanic and Earthquakes.
Unit III / 15 Hours	Geo-Bio Chemical Cycle- Earth - Properties of common elements in Earth - Concepts of geochemical cycles, Anthropogenic activities and climate change-

	The Green House Effect, and Ozone Layer Depletion, Lifestyle for the Environment (LiFE) Movement, concept of One Earth-One Family-One Future

Suggested/ recommended readings:

1. Barry, R. G. & Chorley, R. J. (1998). *Atmosphere, weather and climate.* Routledge, London
2. Christopherson, R. W. & Birkeland, G. H. (2012). *Geosystems: an introduction to physical geography.* Pearson Education, New Jersey.
3. Cornell, S. E.; Prentice, I. C., House, J. I. & Downy, C. J. (2012). *Understanding the earth system - global change science for application.* Cambridge
4. Devi Chand, (1982). tr. *Atharvaveda.* Munshiram Manoharlal. New Delhi.
5. Emiliani, C. (1992). *Planet Earth: cosmology, geology, and the evolution of life and environment.* Cambridge University Press.
6. Griffith, Ralph T. H. (1985). *tr. Hyms of the Atharvaveda.* Munshiram Manoharlal. New Delhi.
7. Grotzinger, J., Jordan, T.H., Press, F & Siever, R. (2007). *Understanding earth.* W. H. Freeman and company, New York.
8. Hewitt C. N. & Jackson A. V. (2009). *Atmospheric science for environmental scientists.* Blackwell
9. Manahan, S. E. (2010). *Environmental chemistry.* Wiley Publication.
10. Marshak, Stephen (2018). *Earth: portrait of a planet,* W. W. Norton & Company
11. Marshall, J. & Plumb, R. A. (2008). *Atmosphere, ocean and climate dynamics: an introductory text.* Elsevier.
12. Mc Geary, D. & Plummer, C. C. (1994). *Earth revealed.* W. C. B. Publishers, Dubuque.
13. Savindra, Singh (2021). *Physical geography,* Pravalika publication, Allahabad.
14. Sharma, Din Dyal (2008). *Atharvaveda: great epics of India.* Maxford Books, New Delhi.
15. Siddhartha, K. (2020). *The earth's dynamic surface: a book of geomorphology,* Kitab Mahal Publishers. New Delhi.
16. Singh, Jagdish & Singh, K. N. (2009). *Bhoutik bhugol.* Radha Publication.
17. Singh, Jagdish (2022). *Paryavaran niyojan evam samvikas.* Gyanodaya Prakashan, Gorakhpur.
18. Skinner, B. J.; Porter, S. C. & Botkin, D. B. (2011). The blue planet: an introduction to earth system science. Willey
19. Srinivas, V. (2024). *G20@2023: the roadmap to Indian presidency.* Pentagon Press
20. Strahler, A. H. & Strahler, A N., (2001). *Modern physical geography.* John Wiley and Sons. New York.
21. Tarback, E. J. & Lutgens, F. K. (2006). *Earth science.* Pearson Prentice Hall. New Jersey.
22. Valdiya, K. S. (2010). *The making of India, geodynamic evolution.* Macmilan Publishers India Ltd.
23. Vidyabhushana, Harchandra (ed.) 1870). *Gopala tapani of the athravaveda.* Visvanatha Shastri, Calcutta: Asiatic Society of Bengal.
24. Wooldridge, S. W. & Morgan, R. S. (1959). *The physical basis of geography: an outline of geomorphology.* Longman. London.
25. Wooldridge, Sidney William & East, William Gordon (1951). *The spirit and purpose of geography: geography series.* Hutchinson University Library. (Ebook/Digital)

MAP READING AND INTERPRETATION

Course Title: Map Reading and Interpretation	**L**	**T**	**P**	**Cr**
Course Code:	2	-	1	3

Type of Course: Skill Enhancement Course (SEC)

Total Hour: 45 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: familiarize with the nature and scope of cartography.
CLO2: develop hands on map making techniques in geographical studies.
CLO3: develop an understanding about the construction of scales.
CLO4: introduce the foundational skills of depicting different relief features and profiles using contours.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: explain map as a geographic tool.
CLO2: apply and construct scales to suit map for various purposes.
CLO3: understand the usage of conventional signs and symbols in map.
CLO4: develop professional capacity and skills to interpret the topographical maps.

Unit/Hours	**Content**
Unit I / 15 Hours	Cartography- Nature and Scope of Cartography, Classification of Maps, History of Maps. Introduction to Digital Map
Unit II / 15 Hours	Map Scale and Layout- Types of scales: statement scale, linear scale, representative fraction scale. Graphical Construction of Scale- simple scale, comparative scale, diagonal scale and Vernier scale. Enlargement and reduction of maps, map design and layout.
Unit III / 15 Hours	Interpretation of Topographical Maps- Conventional signs and Symbols; Representation of Relief features and profiles (serial, superimposed, projected and composite): contours - types, intervals, characteristics and Patterns (representation and interpretation of landforms by contours and their cross sections), Topographical sheets

Suggested/ Recommended readings:

1. Anson, R. W. & Ormelling F. J. (1994). *Basic cartography: For Students, Technicians; Exercise Manuals (*International Cartographic Association). Elsevier.
2. Gupta, K. K. & Tyagi, V. C. (1992). *Working with map, survey of India.* DST. New Delhi.
3. Mishra, R. P. & Ramesh, A. (1989). *Fundamentals of cartography.* Concept Publishing, New Delhi.
4. Monkhouse, F. J. & Wilkinson, H. R. (1985): *Maps and diagrams.* Methuen Co Ltd. London.

5. Raisz, E. (1962). *General cartography.* John Wiley and Sons. New York.
6. Rhind D. W. & Taylor D. R. F., (eds.) (1989). *Cartography: past, present and future.* International Cartographic Association. Elsevier.
7. Robinson, Arthur H.; Morrison, Joel L.; Muehrcke, Phillip C.; Kimerling, A. John & Guptill, Stephen C. (eds.) (2010). *Elements of Cartography.* John Wiley and Sons, Inc. New York.
8. Sarkar, Ashish (1997). *Practical geography: A systematic approach.* Orient Black Swan Private Ltd. New Delhi.
9. Sharma, J. P. (2001). *Prayogik bhugol.* Rastogi Publications. Meerut.
10. Singh, K. N. & Singh, S. N. (2009). *Prayogik bhugol ke mooladhaar* (Vol. 1 & 2). Gyanodaya Prakashan, Gorakhpur.
11. Singh, L. R. (2006). *Fundamentals of practical geography.* Sharda Pustak Bhawan, Prayagraj.
12. Singh, R. L. & Singh, Rana P. B. (1993). *Elements of practical geography.* (Hindi and English editions). Kalyani Publishers, New Delhi.
13. Singh, S. N. (2023). *Prayogatmak Bhugol ke Mooladhaar.* BFC Publication, Gorakhpur.

UNDERSTANDING LAND AND CUTURE OF BHARAT

Course Title: Understanding Land and Culture of Bharat	**L**	**T**	**P**	**Cr**
Course Code:	2	-	-	2
Type of Course: Value-Added Course (VAC)				

Total Hour: 30 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: understand location, geographical setting, boundary setting, socio-cultural and political background of Bharat.

CLO2: comprehend physical, socio-cultural diversity and demographic profile of Bharat.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: Comprehend Bharat as a country and civilization.

CLO2: Understand its Geographical aspects and socio-cultural diversity.

Unit/Hours	**Content**
Unit I / 15 Hours	Nomenclature of Bharat, Location and Extent, Geopolitical significance of Bharat's Location. Importance of the Indian Ocean Region, Historical-Political and Cultural background, Reorganization of Bhartiya states
Unit II / 15 Hours	Diversity in Bharat-Physical-Relief and Drainage System in Bharat, Climate, Vegetation, Linguistic, salient features of demography, changing socio-

	economic scenario and resurgence of Bharat (Viksit Bharat), incredible Bharat

Suggested/ Recommended readings:

1. Ahmed, A. (2009). *Geography of the South Asian Subcontinent: A Critical Approach.* Concept Publishing Company, New Delhi.
2. Ali, S. M. (1966). *Geography of Puranas.* People's Publishing House, New Delhi.
3. Anjaria, J. S., and McFarlane, C. (eds.)(2011). *Urban Navigations: Politics, Space and the City in South Asia.* Routledge, London.
4. Chattopadhyaya, H., and Sarkar, S. K. (eds.) (2003). *Ethnic Composition and Crisis in South Asia: India,* (Vol. 1). Global Vision Publishing House, New Delhi.
5. Hagerty, D. T. (2005). *South Asia in World Politics.* Rowman & Littlefield Publishers, Maryland.
6. Hirst, J. G. S., and Zavos, J. (2013). *Religious Traditions in Modern South Asia.* Routledge. London.
7. Jain, B. M. (2010). *India in the New South Asia: Strategic, Military and Economic Concerns in the Age of Nuclear Diplomacy,* (Vol. 45). IB Tauris,Geneva.
8. Khullar, D. R. (2016). *Bharat Ka Bhugol (Geography of India).* Kalyani Publication, New Delhi.
9. Mathur, S. K. (2007). *Global Economic Trends and South Asia.* ICFAI Books, India.
10. Mitra, A. P., and Sharma, C. (eds.) (2012). *Global Environmental Changes in South Asia: a Regional Perspective.* Springer Science & Business Media, India.
11. Sanyal, S. (2017). *The Ocean of Churn.* Penguin House, India
12. Sanyal, S. (2020). *The Incredible History of the Indian Ocean.* Penguin House, India.
13. Schug, G. R., & Walimbe, S. R. (2016). *A Companion to South Asia in the Past* (Vol. 31). John Wiley & Sons, UK.
14. Singh, Jagdish (2003).*India: A Comprehensive and Systematic Geography.* Gyanodaya Prakashan, Gorakhpur.
15. Singh, Jagdish. (2003).*India: A Comprehensive Systematic Geography.* Radha Publications.
16. Singh, Jagdish, Singh, K. N. & Patel, R. B. (1989). *Bharat Ka Bhugol. Gyanodaya Prakashan,* Gorakhpur.
17. Tiwari, R. C. (2023). *Bharat Ka Bhugol,* Pravalika Publication, Prayagraj.

COMMUNITY SERVICE AND DEVELOPMENT PROGRAMME

Course Title: Community Service and Development Programme	**L**	**T**	**P**	**Cr**
Course Code:	2	-	-	2
Type of Course: Value Added Course (VAC)				

Total Hour: 30 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: familiarize the value of service and social responsibility.

CLO2: demonstrate the ability to work with various communities.

CLO3: acquaint students more precise personal and professional life goals.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: identify community issues, needs, problems, strengths, and resources.

CLO2: develop the ability to communicate effectively and collaborate with others.

CLO3: develop the ability to take initiative, follow direction, lead, and solve problems.

CLO4: develop the quality to work in collectiveness through community engagement.

Unit/Hours	**Content**
Unit 30 Hours	Experiences Sharing-based on Community Service and Development Programme (in surrounding areas of the Campus) Note: Regularity and their involvement in Community Services and in special programmes are the means of assessment and evaluation.

Suggested / Recommended Readings:

1. Post, Chris W. (2012). *Objectives and Prospects for Bringing Service-Learning into the Memory and Heritage Classroom.* Southeastern Geographer, Vol. 52, No. 4, Special Issue: Placing Memory and Heritage in the Geography Classroom (Winter 2012), pp. 413-428 Published by: University of North Carolina Press Stable.
2. Bain, K. (2004). *What the Best College Teachers Do.* Cambridge. Harvard University Press.
3. Barber, B.R. (1991). *A Mandate for Liberty: Requiring Education-Based Community Service.* The Responsive Community1(2):46–55.
4. Bednarz, S.W., Chalkley, B., Fletcher, S., Hay, I., Le Heron, E., Mohan, A., and Trafford, J. (2008). *Community Engagement for Student Learning Geography.* Journal of Geography in Higher Education 32(1):87–100.
5. *CDC, A. (2011). Principles of community engagement.* NIH publication.

SEMESTER-II

HUMAN GEOGRAPHY

Course Title: Human Geography	**L**	**T**	**P**	**Cr**
Course Code:	4	-	-	4
Type of Course: Major Course/Minor Course				

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: broadens understanding of various dimensions of human geography.

CLO2: conceptualized to address the emerging perspectives on cultural identity.

CLO3: acquire knowledge to analyse the data on population growth and its spatial distribution at global and national level.

CLO4: possess the ability to analyze the relationship between space and society.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: understand the holistic perspective on the nature and field of human geography.

CLO2: critically evaluate spatial distribution of population on the earth surface.

CLO3: analyse the relationship between man and environment and his adaptation to different environmental condition.

CLO4: gain in-depth understanding of population dynamics in rural and urban settlements.

Unit/Hours	**Content**
Unit I / 15 Hours	Nature and Scope of Human Geography, Elements of Human Geography, Approaches to Human Geography. Environmental Determinism and Possibilism, Neo determinism (stop and go determinism), Indian view point towards Environment
Unit II / 15 Hours	Evolution of man; Classification of races; Characteristics of races and their broad distribution; Human Habitat Transformation in perspective of Natives: Equatorial regions, Tropical deserts, Temperate grasslands and Tundra region; Culture: Cultural Identity, Ethnicity, Globalization, cultural change. Study of Tribal culture and Heritage in Bharat
Unit III / 15 Hours	Growth of population; Distribution of population, Density of Population; Age, structure and composition of population; Major human agglomerations of the world; Migration-Types, causes and consequences of migration; Salient demographic features of Bharat- spatial and temporal Growth and distribution, age structure and composition, Citizenship Amendment Act, 2019 (CAA)
Unit IV/ 15 Hours	Human Settlements: Definition of settlement and its relevance of study, Types and Patterns of settlements, Factors affecting patterns of rural settlements, urbanization and modernization- Spatial and Temporal Patterns and Trends, Urban sprawl, urban planning, concept of smart cities, rural transformation

Suggested/ Recommended readings:

1. Chandna, R. C. (2017). *Population geography*. Kalyani Publishers. New Delhi,
2. Daniel, P. (2002). *Geography of settlement*. Rawat Publication. New Delhi.
3. Daniel, P. A. & Hopkinson, M. F. (1989). *The geography of settlement*. Oliver & Boyd. London. UK:
4. Ghosh, S. (2019). *Introduction to settlement geography*. Orient Black swan Pvt. Ltd. Kolkata.
5. Hill, M. & Hill, M. R. (2005). *Urban settlement and land use*. Hodder Murray. United Kingdom
6. Hussain, Majid. (2012). *Manav bhugol*.: Rawat Publications. Jaipur. India
7. Johnston, R.; Gregory, D. & Pratt, G., et al. (2008). *The dictionary of human geography*. Blackwell Publication.
8. Jordan-Bychkov & et al. (2006). *The human mosaic: A thematic introduction to cultural geography*. W. H. Freeman and Company. New York. U.S.A.
9. Kaushik, S. D. (2010). Manav Bhugol. Meerut. Rastogi Publication. India.
10. Mandal, R. B. (2001.) *Introduction to rural settlement*. Concept Publishing Company. New Delhi.
11. Maurya, S.D. (2012). Manav Bhugol. Prayagraj. India: Sharda Pustak Bhawan.
12. Navakas, M. C. (2018). *Liquid landscape: geography and settlement at the edge of early America*. United States: University of Pennsylvania Press, Incorporated.
13. Ramachandran, R. (1991). *Urbanization & urban system in India*. Oxford University Press. New Delhi.
14. Siddhartha, K. & Mukherjee, S. (2000). *Cities, urbanization urban system (settlement geography)*. Published Kitab Mahal, Prayagraj.
15. Singh, B. N. (2019). *Manav bhugol ka swaroop*. Pravalika Publications. Prayagraj.
16. Singh, K. N. & Singh, Jagdish (2009). *Manav bhugol*. Radha Publications. New Delhi.
17. Singh, R. B. (Ed.) (2014). *Urban development challenges, risk and resilience in asian mega cities (Advances in Geographical and Environmental Sciences)*. Springer.
18. Singh, R. Y. (2010). *Geography of settlement*. Rawat Publication, Jaipur.
19. Singh, Sarveshwar Nath (2010) *Jansankhya evum adhivas bhugol*, Radha Publications. Delhi.

ENVIRONMENTAL ETHICS AND SUSTAINABLE DEVELOPMENT

Course Title: Environmental Ethics and Sustainable Development	L	T	P	Cr
Course Code:	2	1	-	3

Type of Course: Multidisciplinary Course

Total Hour: 45 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:
CLO1: develop awareness and thinking on contemporary environmental problems.
CLO2: develop thinking on environmental ethics.
CLO3: familiarize with policies of environmental management.
CLO4: learn about Indigenous knowledge systems in sustainable management.
CLO5: develop thinking on the solution of environmental problems.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:
CLO1: understand environment and environmental degradation.
CLO2: understand ethical perspective of environment.
CLO3: develop thinking on sustainable practices.
CLO4: familiar with role of Bhartiya jnana parampara in sustainable planning and management.

Unit/Hours	**Content**
Unit I / 15 Hours	Introduction to Environment, concept of environment and its relevance of study, Environmental crisis-population and environmental degradation, deforestation and environmental degradation, poverty and environmental degradation, environmental crisis in underdeveloped countries, water crisis, economic development and ecology
Unit II / 15 Hours	Environmental Thought- Western and Bhartiya view, attempts of United Nations, Environment Mission and Programmes (UNEP), Interrelationship between human and environment, elements of ecosystem, Bio-Geo chemical cycle, vegetation and ecological system, energy crisis and ecosystem, environmental degradation and ecological imbalances in Bharat, climate change
Unit III / 15 Hours	Environment and Development, concept of sustainable development, Environmental impact analysis, principles of environment management, Sustainable Development Goals, State of SDGs in Bharat, G-20 and Sustainable Development, attempts of sustainable development in Bharat- Namami Gange, Jal Jeewan Mission, sustainable agriculture and food security, quality of life

Suggested/ Recommended readings:

1. Agrawal & Garg (Eds) (1981). *Environment issue and researches in India.* Himanshu Publications, Udaipur.
2. Anjaneyulu, Y. (2002). *Environmental Impact Assessment Methodology.* B.S Publications, Hyderabad.
3. Blewett, J. (ed.) (2008). *Understanding Sustainable Development.* Routledge.
4. Brundtland Commission (1987). *Our Common Future.* Oxford University Press.
5. Chambers, N., Craig, S., & Wackernagel, M. (2004). *Sharing Nature's Interest.* Earthscan Publications Ltd., London.
6. Dalal-Clayton, B. & Bass, S. (2002). *Sustainable Development Strategies: A Resource Book.* Routledge.
7. Dressner, S. (2002). *The Principles of Sustainability.* Earthscan Publications Ltd., London.
8. Elliott, L. (2004). *Global Politics of the Environment.* Palgrave MacMillan, New York.
9. Hulse, J.H. (2007). *Sustainable Development at Risk: Ignoring the Past.* Foundation Books.
10. Jain, R. K., Urban, L. V., & Stacey, G. S. (1981). *Environmental Impact Analysis: a new dimension in decision making.* Van Nostrand Reinhold environmental engineering series (USA).
11. Khoshoo, T. N. (1981). *Environmental Concerns and Strategies.* Ashish Publishing House, New Delhi.
12. Knight, B., Chigudu, H., & Tandon R. (2002). *Reviving Democracy: Citizens at the Heart of Governance.* Earthscan Publications.
13. Kumra, V. K. (1982). *Kanpur City: A Study in Environmental Pollution.* Tara Book Agency, Varanasi.
14. Lohani, Bindu N. (1984). *Environmental Quality Management.* South Asian Publisher, New Delhi.
15. Mollinga, P., Dixit, A., & Athukorala K. (ed.) (2006). *Integrated Water Resources Management.* Sage, New Delhi.
16. Rogers P. (2007). *An Introduction to Sustainable Development.* Earthscan Publications.
17. Sachs, J. (2015). *The Age of Sustainable Development.* Columbia University Press.
18. Singh, D. N., Singh, J., & Raju, K. N. P. (Eds.). (2003). *Water Crisis and Sustainable Management.* Tara Book Agency, Varanasi.
19. Singh, J. (2017). *Paryavaran aur Samvikas.* Gyanodaya Prakashan, Gorakhpur.

MAP PROJECTIONS, WEATHER MAP ANALYSIS AND DIGITAL MAPPING

Course Title: Map Projections, Weather Map Analysis and Digital Mapping	**L**	**T**	**P**	**Cr**
Course Code:	2	-	1	3

Type of Course: Skill Enhancement Course (SEC)

Total Hour: 45 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: give hands-on training to construct various projections.
CLO2: familiarize them with the merits and demerits of using different types of projections.
CLO3: develop the understanding of different weather phenomena and skill to interpret Indian weather maps
CLO4: to introduce with the foundational skills and training of generating digital maps in the digital era.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: skillfully construct the map projections for mapping
CLO2: apply critical thinking skills in the interpretation of weather maps.
CLO3: create and generate digital maps by visualizing spatial data.

Unit/Hours	**Content**
Unit I / 15 Hours	Map Projections – Classification, Properties and Uses; Graphical Construction of Conical: simple conic with one and two standard parallels; Cylindrical: simple and equal area; Polar Zenithal Stereographic, Bonne's and Mercator's Projections; Universal Transverse Mercator (UTM) Projection
Unit II / 15 Hours	Concept of weather and climate, Weather symbols, Interpretation of Indian daily weather maps (July, October and January)
Unit III / 15 Hours	Digital Mapping: Web map design – Web-map and multimedia - Mapping cyberspace – Geovisualization - Map as a decision tools – Web based Electronic Atlases.

Suggested/ Recommended readings:

1. Anson, R. W. & Ormelling F. J. (1994). *Basic cartography: For Students, Technicians; Exercise Manuals (*International Cartographic Association). Elsevier.
2. Bennison, George M.; Oliver, Paul A. & Moseley, Keith A. (eds.) (2022). *An introduction to geological structures and maps*. Routledge. London.
3. Gupta, K. K. & Tyagi, V. C. (1992). *Working with map, survey of India*. DST. New Delhi.
4. Keates, J. S. (1989). *Cartographic design and production*. Longman Scientific and Technical. London.

5. Mishra, R. P. & Ramesh, A. (1989). *Fundamentals of cartography.* Concept Publishing Company (P) Ltd. New Delhi.
6. Monkhouse, F. J. & Wilkinson, H. R. (1985): *Maps and diagrams.* Methuen Co Ltd. London.
7. Raisz, E. (eds.) (1962). *General Cartography.* John Wiley and Sons, New York.
8. Rhind, D. W. and Taylor D. R. F., (eds.) (1989). *Cartography: past, present and future.* International Cartographic Association. Elsevier.
9. Robinson, Arthur H.; Morrison, Joel L.; Muehrcke, Phillip C.; Kimerling, A. John & Guptill, Stephen C. (eds.) (2010). *Elements of Cartography.* John Wiley and Sons, Inc. New York.
10. Sarkar, Ashish (1997). *Practical geography: A systematic approach.* Orient Black Swan Private Ltd. New Delhi.
11. Singh, K. N. & Singh, S. N. (2009). *Prayogik bhugol ke mooladhaar* (Vol. 1 & 2). Gyanodaya Prakashan, Gorakhpur.
12. Singh, L.R. (2006). *Fundamentals of practical geography.* Sharda Pustak Bhawan, Prayagraj.
13. Singh, R. L. & Singh, Rana P. B. (1993). *Elements of practical geography.* (Hindi and English editions). Kalyani Publishers, New Delhi.
14. Singh, S. N. (2023). *Prayogatmak bhugol ke mooladhaar.* BFC Publication, Gorakhpur.
15. Steers, J. A. (1970). *An Introduction to the Study of Map Projections,* University of London Press, London.

GEOGRAPHY OF CULTURE AND HERITAGE OF BHARAT

Course Title: Geography of Culture and Heritage of Bharat	**L**	**T**	**P**	**Cr**
Course Code:	2	-	-	2

Type of Course: Value Added Course (VAC)

Total Hour: 30 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: in-depth understanding of culture and heritage of Bharat.
CLO2: explain spatial dynamics of culture and heritage.
CLO3: understand basics concepts of heritage and particularly how diverse communities understand, practice and preserve heritage.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:
CLO1: conceptual understanding of culture and heritage of Bharat.
CLO2: heritage Conservation with Particular Reference to Bharat.

Unit/Hours	**Content**
Unit I / 15 Hours	Understanding Culture, Heritage and Creation of Space: definition, concept, scope, culture and nation- idea of Bharat, Bharat as cultural hearth, cultural regionalisation of Bharat, role of cultural and heritage tourism in unitary of Bharat, heritage and socio-economic development.
Unit II / 15 Hours	Heritage Conservation with Particular Reference to Bharat: Mapping, managing and interpreting heritage in India, meaning of heritage- Intangible and tangible heritage and Heritage complexities, government of India policies and programs on heritage conservation. UNESCO heritage sites in Bharat.

Suggested/ Recommended readings:

1. Aijazuddin Ahmad (2012), Social Geography of India –Concept Publishing Company Pvt Ltd, New Delhi.
2. Aijizuddin Ahmed (2007) Social Geography Rawat Publication Jaipur.
3. Casino V. J. D., Jr., (2009) Social Geography: A Critical Introduction, Wiley Blackwell.
4. Cater J. and Jones T., (2000) Social Geography: An Introduction to Contemporary Issues, Hodder Arnold
5. David Atkinson (2007) Cultural Geography Rawat Publication Jaipur.
6. Mohanty, G. S. (2005) Social and Cultural Geography- Isha books.
7. Panelli R., (2004): Social Geographies: From Difference to Action, Sage.
8. Rachel P., Burke M., Fuller D., Gough J., Macfarlane R. and Mowl G., (2001): Introducing Social Geographies, Oxford University Press
9. S.D. Maurya (2022), Cultural Geography, Sharda Pustak Bhawan, Publication,India
10. Sen Jyortirmoy, (2016), A Textbook of Social and Cultural Geography, Kalyani Publishers; 3rd edition, India
11. Smith S. J., Pain R., Marston S. A., Jones J. P., (2009): The SAGE Handbook of Social Geographies, Sage Publications.
12. Valentine G., (2001): Social Geographies: Space and Society, Prentice Hall.

SEMESTER-III

FUNDAMENTALS OF GEOMORPHOLOGY

Course Title: Fundamentals of Geomorphology	**L**	**T**	**P**	**Cr**
Course Code:	3	1	-	4

Type of Course: Major Course/ Minor Course

Total Hour: 45 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:
CLO1: develop curiosity in the field of geotectonics.
CLO2: understand the theories and models of landscape evolution.
CLO3: familiarise with the drainage and channel morphology.
CLO4: develop analytical thinking on geomorphology from the real world.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:
CLO1: comprehend fundamentals of geotectonics.
CLO2: explain the theories and models of landscape evolution.
CLO3: in-depth understand the evolution of geomorphic landforms.
CLO4: explain the drainage and channel morphology.

Unit/Hours	**Content**
Unit I / 15 Hours	Geotectonics- Nature and scope of geotectonics and geomorphology; Geological time scale; Methods of age dating; Continental drift theory; Sea Floor Spreading theory; Plate Tectonics
Unit II / 15 Hours	Theories and Models- Fundamental concepts in Geomorphology; Theory of Isostasy - Views of Airy and Pratt; Mountain Building Theories– concept of Kober, Daly and Holmes
Unit III / 15 Hours	Evolution of landforms- Normal cycle of erosion: William Morris Davis, Penck and L.C King; Rejuvenation and Polycyclic reliefs. Evolution of geomorphic landforms: fluvial, glacial, coastal and aeolian
Unit IV/ 15 Hours	Drainage and channel morphology- Drainage patterns and its type; concept of graded stream; river channels — form, pattern and dynamics; Regional geomorphology of Middle Ganga Plain

Suggested/ Recommended readings:

1. Ahmed, E. (1985). *Geomorphology*. Kalyani Publishers, New Delhi.
2. Anderson, R.S., & Anderson, S.P. (2010). *Geomorphology: The Mechanics and Chemistry of Landscapes*. Cambridge University Press, Cambridge.
3. Bierman, P.R. & Montgomery, D.R. (2014). *Key Concepts in Geomorphology*. Macmillan Education, New York.
4. Bloom, A.L. (2003). *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*. Prentice Hall.

5. Cook, S., Clarke, L., & Nield, J. (2012). *Geomorphological Techniques*. British Society for Geomorphology, UK.
6. Dayal, P. (1994). *A text book of Geomorphology*. Kalyani Publishers, New Delhi.
7. Goudie, A. (1991). *Geomorphological Techniques*. Routledge. London.
8. Huggett, R.J. (2011). *Fundamentals of Geomorphology*. Routledge, New York.
9. Kale, V. S., & Gupta, A. (2001). *Introduction to Geomorphology*. Orient Longman, Hyderabad.
10. Sharma, P. R. & Mishra, S.P. (eds.), (1993). *Applied Geomorphology in Tropics*. Rishi Publications, Varanasi.
11. Singh, S. (2000). *Geomorphology* (in Hindi). Vasundhra Prakashan, Gorakhpur.
12. Singh, S. (2004). *Geomorphology*. Prayag Pustak Bhawan, Allahabad.
13. Sparks, B. W. (1986). *Geomorphology*. Longmans, London.
14. Thornbury, W.D. (2005). *Principles of Geomorphology*. John Wiley and Sons, New York.
15. Verma, V. K. (2023). *Geomorphology*. Rawat Publications, New Delhi.
16. Wooldridge, S. W., & East, W. G. (1951). *The Spirit and Purpose of Geography: Geography Series*. Hutchinson University Library.

CLIMATOLOGY

Course Title: Climatology	**L**	**T**	**P**	**Cr**
Course Code:	3	-	1	4
Type of Course: Major Course				
Total Hour: 60 Hours				

Course Learning Objectives (CLO): By studying this course, students would be able to:
CLO1: understand atmospheric phenomena.
CLO2: develop curiosity in atmospheric dynamics.
CLO3: develop thinking in complex climatic processes through realizing the real-world scenario.
CLO4: develop skills in weather analysis.
CLO5: familiar with weather forecasting techniques and recent weather apps.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:
CLO1: explain atmosphere dynamics and climatic processes.
CLO2: develop thinking on atmospheric phenomena.
CLO3: explain the processes that drive the global as well as regional wind circulation.
CLO4: develop analytical skill using weather maps and apps.

Unit/Hours	**Content**
Unit I / 15 Hours	Fundamentals of climatology; Understanding season; Solar radiation and Terrestrial radiation; Greenhouse effect and global heat budget; Temperature: concept, measurement, scales, daily and annual cycles of temperature; vertical distribution; Temperature Inversion

Unit II / 15 Hours	Understanding water's changes state; Humidity; Adiabatic temperature changes; Stability and Instability in atmosphere; Clouds; Types of Fogs; Process of precipitation; Forms of precipitation.
Unit III / 15 Hours	Forces affecting wind; Scale of wind; Wind circulation Models of general circulation of the atmosphere: Jet stream, Air masses; fronts: characteristics, movements, Tropical cyclones and temperate cyclones: mechanism and characteristics; Genesis of Indian Monsoon and the causes of its variability; Oscillations: El Nino southern Oscillation; Indian Ocean and dipole.
Unit IV/ 15 Hours	Interpretation of weather maps; trend of isobar, Indian Meteorological Department and All India Weather Forecast; Weather apps; Preparing local climate report

Suggested/ Recommended readings:

1. Ahrens, C. D. (2016). *Meteorology Today: An Introduction to Weather, Climate and the Environment (11th ed.)*. Thomson Brook/Cole, Boston.
2. Barry, R. G., & Chorley, R. J. (2009). *Atmosphere, Weather and Climate*. Routledge.
3. Critchfield, H. J. (2008). *General Climatology*. Pearson Education India.
4. Gregory, D., Johnston, R., Pratt, G., Watts, M., & Whatmore, S. (Eds.). (2011). *The dictionary of human geography*. John Wiley & Sons.
5. Kusky, T. (2017). *The Encyclopedia of Earth Science*. Viva Book Private Limited.
6. Lal, D. S. (1998). *Climatology*. Chaitanya Publishing House, Allahabad.
7. Lutgens, F. K., & Tarbuck, E. J. (2013). *The Atmosphere: An Introduction to Meteorology*. Pearson.
8. Lutgens, F. K., Tarbuck, E. J., & Tusa, D. (1995). *The Atmosphere*. Englewood Cliffs, NJ, Prentice-Hall, USA.
9. Petterssen, S. (2011). *Introduction to Meteorology*. Read Books Ltd.
10. Roy, R. (2013). *Introduction to General Climatology*. Anmol Publication Private Limited, New Delhi.
11. Singh, M. B. (1998). *Jalvayu Avam Samudra Vigyan*. Tara Book Agency, Varanasi.
12. Singh, M. B. (1999). *Climatology and Hydrology*. Tara Book Agency, Varanasi. (In Hindi).
13. Singh, S. (2005). *Climatology*. Prayag Pustak Bhawan, Allahabad.
14. Singh, S. (2017). *Physical Geography*. Prayag Pustak Bhavan, Allahabad.
15. Strahler, A. N. (2013). *An Introduction to Physical Geography*. John Wiley & Sons, UK.
16. Veena. (2009). *Understanding Earth Science*. Discovery, Delhi.
17. Wallace, J. M., & Hobbs, P. V. (2006). *Atmospheric Science: An Introductory Survey*. Academic Press.

GEOGRAPHY OF INDIAN OCEAN REGION

Course Title: Geography of Indian Ocean Region	**L**	**T**	**P**	**Cr**
Course Code:	3	-	-	3

Type of Course: Multidisciplinary Course

Total Hour: 45 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: develop understanding of Indian ocean region. The students will learn about physical, climate and rich biodiversity aspects of the Indian ocean and adjacent countries.

CLO2: understand historical, cultural and economic importance of the Indian ocean region

CLO3: comprehend geostrategic importance in contemporary period.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: familiarize with Indian ocean region and adjacent countries in context to its physical, climatic and rich biodiversity.

CLO2: understand historical, cultural and economic importance of the Indian ocean region

CLO3: understand political importance of Indian Ocean Region

Unit/Hours	**Content**
Unit I / 15 Hours	Indian Ocean Region (IOR) – origin of Indian ocean, geographical location and extent and delimitations of IOR, Adjacent countries and Islands, Topography of Indian ocean (Continental shelf, slope, basin, ridges, seamounts), Indian Monsoon, marine biodiversity and resources.
Unit II / 15 Hours	Historical, cultural and economic importance: role of Indian Ocean in shaping human history of Bharat and other adjacent countries, migration, Indian ocean as sea route for trade, commerce and mining– Sagarmala, Port of call.
Unit III / 15 Hours	Indian Ocean Region as Geo-Strategic space – string of pearls, necklace of diamonds, security and regional cooperation. Evolving importance of the Indo-Pacific and Quad

Suggested/ Recommended readings:

1. Ahmed, A. (2009). *Geography of the South Asian Subcontinent: A Critical Approach*. Concept Publishing Company, New Delhi.
2. Ali, S.M. (1966). *Geography of Puranas*. People's Publishing House, New Delhi
3. Anjaria, J. S., & McFarlane, C. (eds.), (2011). *Urban Navigations: Politics, Space and the City in South Asia*. Routledge, London.
4. Batra, A. (2012). *Regional Economic Integration in South Asia: Trapped in Conflict?* (Vol. 64). Routledge, London.

5. Chattopadhyaya, H., and Sarkar, S. K. (eds.) (2003). *Ethnic Composition and Crisis in South Asia: India(Vol. 1)*. Global Vision Publishing House, New Delhi.
6. Hagerty, D. T. (2005). *South Asia in World Politics*. Rowman & Littlefield Publishers. Maryland.
7. Hirst, J. G. S., and Zavos, J. (2013). *Religious Traditions in Modern South Asia*. Routledge, London.
8. Jain, B. M. (2010). *India in the New South Asia: Strategic, Military and Economic Concerns in the Age of Nuclear Diplomacy(Vol. 45)*. IB Tauris. Geneva.
9. Mathur, S. K. (2007). *Global Economic Trends and South Asia*, ICFAI Books. India
10. Mitra, A. P., and Sharma, C. (eds.) (2012). *Global Environmental Changes in South Asia: A Regional Perspective*. Springer Science & Business Media, India
11. Nag, P. (1988). *Indian Ocean Atlas, National Atlas & Thematic mapping Organization*, Kolkata.
12. Sanyal, S.(2017). *The Ocean of Churn*. Penguin House, India
13. Sanyal, S., (2020). *The Incredible History of the Indian Ocean*. Penguin House, India.
14. Schug, G. R., and Walimbe, S. R. (2016). *A Companion to South Asia in the Past (Vol. 31)*. John Wiley & Sons, UK.
15. Siddiq, M. (1997). *Indian in the Indian Ocean: A Geopolitical Study*, Rawat Publications, Jaipur.
16. Singh, Jagdish, Singh, K. N. and Patel, R. B. (1989). *Bharat Ka Bhugol*. Gyanodaya Prakashan, Gorakhpur.
17. Singh, Jagdish. (2003). *India: A Comprehensive and Systematic Geography*. Gyanodaya Prakashan, Gorakhpur.
18. Singh, Jagdish. (2003). *India: A Comprehensive Systematic Geography*. Radha Publications, New Delhi.
19. Singh, T. D. (1988). *Hind Mahasagar Avam Parimandaliya Rashtra: Ek Bhougolik Adhyayan*, Tara Book Agency, Varanasi.
20. Tiwari, R. C. (2023). *Bharat Ka Bhugol*. Pravalika Publication, Prayagraj.

REMOTE SENSING AND GIS IN GEOGRAPHY

Course Title: Remote Sensing and GIS in Geography	L	T	P	Cr
Course Code:	1	-	2	3

Type of Course: Skill Enhancement Course (SEC)

Total Hour: 45 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:
CLO1: familiarise with Remote Sensing and GIS.
CLO2: learn the application of Geospatial Technology.
CLO3: learn the interpretation of aerial photography, satellite images.
CLO4: develop skills in Geospatial Technology.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:
CLO1: understand the fundamentals of remote sensing and GIS.
CLO2: interpret aerial photography, satellite images and its applications.
CLO3: understand geographic data, datum and projection in GIS.
CLO4: learn the basics of GIS software.

Unit/Hours	Content
Unit I / 15 Hours	Remote Sensing- Concept and Scope; Types of Remote Sensing: Air borne and Space borne; Electro-magnetic Radiation: Characteristics, Spectral regions and Bands; Interaction with earth surface features and atmosphere; Spectral Signature.
Unit II / 15 Hours	Aerial photos- Types and Characteristics; Remote Sensing satellites: Platforms and sensors; Visual and Digital image processing techniques; Remote Sensing application in resource mapping and environmental monitoring.
Unit III / 15 Hours	Definitions of GIS and Related Terms; Components of GIS; Geographical Data Characteristics and GIS; Coordinate Systems, Datums and Projections in GIS. Digital representation of Geographic Data; Raster and Vector models for Geographic Data. Procedures of GIS: data input, geo-referencing, data editing and output.

Suggested/ Recommended readings:

1. Lillesand, T. M., & Kiefer, R. W. (2000). *Remote Sensing and Image Interpretation (4th ed.)*. John Wiley & Sons.
2. Swain, P. H., & Davis, S. M. (Eds.). (1978). *Remote Sensing: The Quantitative Approach*. McGraw Hill.
3. Demers, M. N. (2000). *Fundamentals of Geographic Information Systems*. John Wiley & Sons.
4. Burrough, P. A., & McDonnell, R. (1998). *Principles of Geographic Information Systems*. Oxford University Press.
5. Campbell, J. B. (2002). *Introduction to Remote Sensing (5th ed.)*. Taylor & Francis.

6. Chang, K. T. (2003). *Introduction to Geographic Information Systems*. Tata McGraw Hill Publications Co.
7. Cracknell, A., & Cracknell, A. P. (1990). *Remote Sensing Year Book*. Taylor and Francis.
8. Curran, P. J. (1985). *Principles of Remote Sensing*. Longman.
9. Deekshatulu, B. L., & Rajan, Y. S. (Eds.). (1984). *Remote Sensing*. Indian Academy of Science.
10. Floyd, F., & Sabins, Jr., F. F. (1986). *Remote Sensing: Principles and Interpretation*. W.H. Freeman.
11. Guham, P. K. (2003). *Remote Sensing for Beginners*. Affiliated East-West Press Pvt. Ltd.
12. Heywood, I. (2003). *An Introduction to Geographical Information Systems* (2nd ed.). Pearson Publ. Co.
13. Nag, P. (Ed.). (1992). *Thematic Cartography and Remote Sensing*. Concept Pub. Co.
14. Silver, M., & Balmori, D. (Eds.). (2003). *Mapping in an Age of Digital Media*. Wiley Academy.
15. Spurr, R. (1960). *Photogrammetry and Photo Interpretation*. The Roland Press Co.
16. Survey of India. (1973). *Photogrammetry*. Survey of India.
17. Bhatta, B. (2010). *Remote Sensing and GIS*. Oxford University Press.
18. Chauniyal, D. D. (2004). *Remote Sensing and Geographic Information Systems* (in Hindi). Sharda Pustak Bhawan.
19. Nag, P., & Kudrat, M. (1998). *Digital Remote Sensing*. Concept Publishing Company.
20. Reddy, M. A. (2001). *Textbook of Remote Sensing and Geographic Information Systems*. B. S. Publications.
21. Siddiqui, M. A. (2005). *Introduction to Geographical Information Systems*. Sharda Pustak Bhawan.

SEMESTER-IV

BHARAT: A COMPREHENSIVE SYSTEMATIC GEOGRAPHY

Course Title: Bharat: A Comprehensive Systematic Geography	**L**	**T**	**P**	**Cr**
Course Code:	4	-	-	4

Type of Course: Major Course/Minor Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:
CLO1: understand Bharat and its importance.
CLO2: describe the basis of resources in Bharat.
CLO3: understand the pattern and level of development in Bharat.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:
CLO1: explain geopolitical importance of Bharat.
CLO2: understand the basis of resources.
CLO3: analyse the pattern and level of development.

Unit/Hours	**Content**
Unit I / 15 Hours	Nomenclature, Geopolitical Significance of Bharat; The importance of Indian Ocean; Geological Origin & Evolution of India's Mountains, Plateaus, Plains, and Coast; Origin of River Systems.
Unit II / 15 Hours	Agriculture in Indian Economy, New Agriculture Policy, Agro-Climatic Regions, Agro-ecological regions, the green revolution – inputs and infrastructure, gains and pains, Sustainable Agriculture- Concept and Relevance in present context, Role of Green Revolution & Bio technology in agriculture
Unit III / 15 Hours	Emerging energy scenario and prospect of alternative energy in Bharat; Mineral resource regions; Population Characteristics. Population Resource Regions; Regional Urbanization; Industrial Regions & Industrial Complexes. Industrial Policies, Trend of Industrialization; the impact of LPG on economy
Unit IV/ 15 Hours	Problems of space economy and regional development- background of development, the planning era, NITI Ayog, Regional disparity, the poverty syndrome, poverty alleviation programmes, the wind of change, the technological revolution, regional development and planning, bases of delineation of planning regions

Suggested/ Recommended readings:

1. Gautam, A. (2001). *Geography of India.* Sharda Pustak Bhawan, Allahabad.
2. Govt. of India. *Economic Survey*. Ministry of Finance, New Delhi (Different Issues).
3. Hussain, M. (2008). *Advance Geography of India.* Tata Mc Graw Hill, New Delhi.
4. Johnson, B.L.C. (1983). *Development in South Asia.* Penguin Books, Harmondsworth.
5. Khullar, D.R. (2006). *India: A Comprehensive Geography*. Kalyani Pub., New Delhi.
6. Kundu, A. and Raja, M. (1982). *Indian Economy: The Regional Dimension.* New Delhi: Spektrum Publishers and Distributors.
7. Sharma, T. C. (2003). *India: Economic and Commercial Geography*, Vikas Publication, New Delhi.

8. Singh, G. (1988). *Geography of India*. Atmaram & Sons, Agra.
9. Singh, J. (2001). *Bharat: Bhougolik Adhar Adhaar Evam Ayam*. Gyanodaya Prakashan, Gorakhpur.
10. Singh, J. (2003). *India: A Comprehensive and Systematic Geography*. Gyanodaya Prakashan, Gorakhpur.
11. Singh, R. L. (ed.) (1971). *India. A Regional Geography*. National Geographical Society of India, Varanasi.
12. Tiwari, R. C. (2007). *Geography of India*. Prayag Pustak Bhawan, Allahabad.
13. Wadia, D. N. (1959). *Geology of India*. Mac-Millan and Company, London and student edition, Madras.

FUNDAMENTALS OF ECONOMIC GEOGRAPHY

Course Title: Fundamentals of Economic Geography	**L**	**T**	**P**	**Cr**
Course Code:	4	-	-	4

Type of Course: Major Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: understand the concept of economic activities in the world.

CLO2: describe various economic theories.

CLO3: understand regionalization of different economic activities.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: explain nature of economic geography and able to understand the key drivers of economic change.

CLO2: evaluate critically how different theories and models are applicable in the economic development of different regions.

CLO3: explain changing concept of development, world trade patterns and theory on international trade.

CLO4: analyze how the economy is organized within the power space relation.

Unit/Hours	**Content**
Unit I / 15 Hours	Definition, scope and relevance of Economic Geography, Classification of economic activities, Concepts in Economic Geography, Global Economic System, New economic order of the world.
Unit II / 15 Hours	Distribution, production and trade pattern of Mineral and energy resources in the world- iron ore, bauxite, manganese, coal, petroleum, hydro energy and uranium; Energy crisis, non-conventional energy resources, Concept of one sun, one earth and one grid.
Unit III / 15 Hours	Concept of Agriculture regions of the world, Bases of delimitations of Agriculture regions, salient features of different agricultural regions, critical analysis of agricultural land use theory by Von Thunen.

Unit IV/ 15 Hours	Concept and classification of Industries, Geographical factors of industrial location, Industrial location theories- Weber's theory, Hoover's Theory, Losch's Theory, major industrial regions of the world, theories of economic growth- Rostow's model, trickle-down effect, growth pole theory, IT and economy, international trade and trade organizations.

Suggested/ Recommended readings:

1. Alexander J. W. (1963).*Economic Geography.* Prentice-Hall Inc., Englewood Cliffs, N.J.
2. Alexander, J.W.(2012). *Economic Geography.* Prentice Hall of India, New Delhi.
3. Bagchi-Sen S. and Smith H. L. (2006). *Economic Geography: Past, Present and Future.* Taylor and Francis.
4. Berry, B.J.L. et al. (1976). *Geography and Economic Systems.* Prentice Hall, Englewood Cliff.
5. Coe N. M., Kelly P. F. and Yeung H. W. (2007). *Economic Geography: A Contemporary Introduction.* Wiley-Blackwell.
6. Combes P., Mayer T. and Thisse J. F. (2008). *Economic Geography: The Integration of Regions and Nations.* Princeton University Press.
7. Gautam, A. (2010). *Advanced Economic Geography.* Sharda Pustak Bhawan, Allhabad. Hodder B. W. an
8. Guha, J. S. and Chattoraj, P.R. (2002). *A New Approach to Economic Geography: A Study of Resources.* The World Press Private Limited, Kolkata.
9. Haggett, P. (1966). *Locational Analysis in Human Geography.* St. Martin's Press, NY.
1. Hudson, R. (2005). *Economic Geography.* Sage Publication, New Delhi.
2. Jones, C.F. and Darkenwald G.G. (1960). *Economic Geography.* New York.
10. Knowled, R. and Wareing, J. (1992). *Economic and Social Geography.* Rupa and Company, Calcutta.
11. Knox, P. (2003). *The Geography of World Economy.* Arnold, London.
12. Knox, P. and Agnew, J. (1998). *The Geography of the World Economy.* Arnold, London.
13. Lee R. (1974). *Economic Geography.* Taylor and Francis.
14. Kumar, N. (1991). *Geography of Transportation.* Concept Publications.
15. Rostov, W.W. (1960). *The Stages of Economic Growth.* Cambridge Univ. Press, London.
16. Saxena, H.M. (2013). *Economic Geography.* Rawat Publications, Jaipur.
17. Sharma T.C. and Countinho. O. (1998). *Economic and Commercial Geography of India.* Vikas Publishing house, Delhi.
18. Singh, K. N. and Singh, J. (1996). *Arthik Bhoogol Ke Mooltatva.* Gyanodaya Prakashan, Gorakhpur.
19. Singh, K.N. and Siddiqui, A. (2012). *Economic Geography.* Prayag Pustak Bhawan, Allahabad.
20. Smith, G.H. (2000). *Conservation of Natural Resources.* John Wiley, New York.
21. Wheeler, J.O. et.al. (1995). *Economic Geography.* John Wiley, New York.
22. Willington D. E. (2008). *Economic Geography.* Husband Press.

WATERSHED MANAGEMENT

Course Title: Watershed Management	**L**	**T**	**P**	**Cr**
Course Code:	3	1	-	4

Type of Course: Major Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: understand the various approaches of watershed development.

CLO2: familiarize with watershed characteristics.

CLO3: understand the process of erosion and its control within watersheds.

CLO4: develop thinking on different water conservation practices and management.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: understand diverse methods of collecting the hydrological information.

CLO2: describe how components of the water cycle are influenced by human activities.

CLO3: explain the process of erosion and its control within watersheds.

CLO4: innovate methods of water conservation and management.

Unit/Hours	**Content**
Unit I / 15 Hours	Concept of watershed development, objectives of watershed development, need for watershed development in India, Integrated and multi-disciplinary approach for watershed management.
Unit II / 15 Hours	Characteristics of watershed- Size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socioeconomic characteristics, basic data on watersheds.
Unit III / 15 Hours	Erosion and its control- Types of erosion, factors affecting erosion, effects of erosion on land fertility and land capability, Measures to control erosion: Contour techniques, ploughing, furrowing, trenching, bunding, terracing.
Unit IV/ 15 Hours	Water conservation and management- Rainwater Harvesting, indigenous knowledge for water conservation, catchment harvesting, harvesting structures, check dams, artificial recharge, farm ponds, percolation tank, Water Policy.

Suggested/ Recommended readings:

1. Majumdar, D.K. (2004). *Irrigation Water Management.* (3rd Ed.). Prentice Hall of India.
2. Murthy, V.V.N. & Jha, M. K. (2015). *Land and Water Management.* (6th Ed.). Kalyani Publishers.
3. Murty, J. V. S. (2013). *Watershed Management.* (2nd Ed.). New Age International.
4. Narayana, D., Sastry, V.V. G. & Patnaik, U.S. (1997). *Watershed Management.* ICAR, New Delhi Publishers.
5. Singh, P. K. (2000). *Watershed Management: Design and Practice.* E-media Publications, Udaipur.
6. Singh, R. (2000). *Watershed Planning and Management.* Yash Publishing House, Bikaner.

SOCIO-ECONOMIC SURVEY
(SURROUNDING AREAS OF CAMPUS)

Course Title: Socio-economic survey (surrounding areas of campus)	**L**	**T**	**P**	**Cr**
Course Code:	1	-	1	2

Type of Course: Major Course

Total Hour: 45 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: conduct Social and economic survey of chosen surrounding villages/ towns)

CLO2: develop the understanding of basic socio-economic characteristics of village/town/households.

CLO3: familiarize the students to prepare base map of the study area.

CLO4: evaluation based on critical field-survey report in addition to photographs, sketches, maps and diagrams.)

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: develop skill in conducting field study and preparing filed sketch and mapping by surveying.

CLO2: apply statistical techniques to field data.

CLO3: convert surveyed data into tabular and pictorial forms

CLO4: prepare field report using analytical and interpretation skills.

Unit/Hours	**Content**
Unit I / 15 Hours	Field study in Geography – Role, Significance and ethics of field survey Tools of Socio-economic survey- questionnaire and schedule.
Unit II / 15 Hours	Survey regarding Govt. Policy, Plans and Programmes for development.

Suggested/ Recommended readings:

1. Creswell, J. (1994). *Research design: qualitative and quantitative approaches*. Sage Publications.
2. Evans, M. (1988). *Participant observation: The researcher as research tool in qualitative methods in human geography*, eds. By J. Eyles and D. Smith, Polity.
3. Galvan, Melisa C. & Pyrczak Fred (2023). *Writing empirical research reports: A basic guide for students of the social and behavioural sciences*. Routledge.
4. Jones, P. A. (1968). *Field work in geography*. Longman Scientific and Technical. London.
5. Maity, S. K. (2021). *Essential graphical techniques in geography*. Singapore: Springer Singapore.
6. McSweeney, Kendra & Winkler Prins, Antoinette (2021). *Geographical fieldwork in the 21st century*. Taylor & Francis. United Kingdom.
7. Mukherjee, Neela (2002). *Participatory Learning and Action: with 100 Field Methods*. Concept Publishing Company (P) Ltd. New Delhi.
8. Rogerson, P. A. (2019). *Statistical methods for geography: a student's guide*. SAGE Publications. United Kingdom.
9. Stoddard, H. Robert (eds.) (1982). *Field Techniques and Research Methods in Geography*. Kendall/Hunt Publishing Co.
10. Wolcott, H. (1995). *The Art of Fieldwork*. Alta Mira Press, Walnut Creek, CA.

INSTRUMENTAL SURVEY

(SURROUNDING AREAS OF CAMPUS)

Course Title: Instrumental survey (surrounding areas of campus)	**L**	**T**	**P**	**Cr**
Course Code:	1	-	1	2

Type of Course: Major Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: familiarize with the basic principles, problems and procedures of surveying.
CLO2: hands-on exercises by using modern surveying instruments like Total Station & GPS.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: understand various surveying concepts.
CLO2: develop the skill and ability to conduct land use survey using advance instruments like total station in a proper manner.
CLO3: handle GPS instrument for preparing more accurate and precise mapping.

Unit/Hours	Content
Unit I /15 Hours	Surveying Instrument: Use of Total Station and GPS
Unit II /15 Hours	Conducting Surveys, Surveys for land use.

Suggested/ Recommended readings:

1. Gopi, Satheesh; Sathikumar, R. & Madhu, N. (2006). Advanced surveying: Total station, GIS and remote sensing. Pearson Education India.
2. Gupta, K. K. & Tyagi, V. C. (1992), *Working with map, survey of India*. DST. New Delhi.
3. Kaplan, Elliott D. & Christopher, J, Hegarty (2006). *Understaanding GPS principles and applications*. Artechhouse. London.
4. Mishra, R. P. & Ramesh, A. (1989). *Fundamentals of cartography*. Concept Publishing Co. New Delhi.
5. Pandey, Shivam & Tripathi, Shashikant (2020). *Basic concept of remote sensing, GPS and GIS*. Sankalp Publication.
6. Raisz, E. (1962). *General cartography*. John Wiley and Sons. New York.
7. Sarkar, Ashish (1997). *Practical geography: A systematic approach*. Orient Black Swan Private Ltd. New Delhi.
8. Sharma, J. P. (2001). *Prayogik bhugol*. Rastogi Publications. Meerut.
9. Singh, K. N. & Singh, S. N. (2009). *Prayogik bhugol ke mooladhaar* (Vol. 1 & 2). Gyanodaya Prakashan, Gorakhpur.
10. Singh, L. R. (2006). *Fundamentals of practical geography*. Sharda Pustak Bhawan, Prayagraj.
11. Singh, R. L. & Singh, Rana P. B. (1993). *Elements of practical geography*. (Hindi and English editions). Kalyani Publishers, New Delhi.

SEMESTER-V

FUNDAMENTALS OF GEOGRAPHICAL THOUGHT

Course Title: Fundamentals of Geographical Thought	**L**	**T**	**P**	**Cr**
Course Code:	4	-	-	4
Type of Course: Major Course				
Total Hour: 60 Hours				

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: Understand evolution and development of geography as a discipline and contribution of various schools of thought from ancient to contemporary period.

CLO2: Understand various debates, subject matter and methodologies in geography through different paradigms and also future of geography.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: describe the theoretical traditions and contemporary lines of thought of the discipline.

CLO2: analyse the philosophical and methodological standpoints of leading geographers.

CLO3: explain the continuities in geographic thought over time.

CLO4: comprehend the debates and issues that geographers have wrestled with for decades.

CLO5: Explain and analyse the contemporary geographical thought.

Unit/Hours	**Content**
Unit I / 15 Hours	The nature and scope of Geography: its place in the classification of Sciences Epistemology of geography; Contribution of major proponents in geography in the ancient world- Bhartiya, Greeks, Romans and Arabs; Development of Geography during Renaissance and Scientific Period, (Varenius and Kant), Reine Geography
Unit II / 15 Hours	Contribution of Various Schools-German, French, American, Great Britain, and Russian Schools, Geography in Bharat, Concept of earth surface, landscape and space
Unit III / 15 Hours	Approaches in Geography; Dualism in Geography, Paradigms in Geography- Human and Environment Relationship, Concept of Areal Differentiation, system analysis, spatial organization, Idealism and realism in Geography, Positivism in Geography, Quantitative revolution
Unit IV/ 15 Hours	Behaviouralism and Humanistic Geography; Radical Geography, Gender and Feminist Geography, Postmodernism; Changing methodologies of geography in the Globalizing World

Suggested/ Recommended readings:

1. Castree, N., Rogers, A., & Sherman, D. J. (Eds.). (2005). *Questioning geography: fundamental debates*. Oxford: Blackwell.
2. Cresswell, Tim. (2012). *Geographic Thought: A Critical Introduction.* Wiley Blackwell, Boston.
3. Dikshit, R. D. (2018). *Geographical Thought. A Critical History of Ideas*, Prentice-Hall of India, New Delhi.
4. Downs, R. M., & Tuan, Y. F. (1978). Space and place: The perspective of experience. *Geographical Review*, 68(3), 375.
5. Dube, B. (1967). *Geographical Concepts in Ancient India*, National Geographical Society of India, Varanasi
6. Hartshorne R. (1939). *The Nature of Geography*, AAG, New York.
7. Harvey, D. (1969). *Explanation in Geography*, Arnold, London
8. Hussain, M. (2005). *Bhaugolik Chintan Ka Itihas*. Rawat Publication, New Delhi.
9. Hussain, M.& Singh, R. (2008). *Bhaugolik Models*. Mcgraw Hill Education India.
10. Hussain, M., (2014). *Evolution of Geographical Thought*, 6th edition, Rawat Publisher, New Dehi.
11. Livingstone, D. (1992). *The Geographical Tradition: Episodes in the History of a Contested Enterprise*. Wiley Blackwell,New York.
12. Mourya S. D. (2021). *Bhaugolik Chintan Ka Itihas*. Pravalika Publication, Prayagraj.
13. Peet, R. (1998). *Modern Geographical Thought*. Wiley-Blackwell, New York.
14. Raju, S. Kumar, M. Satish, and Corbridge, S. (eds). (2006). *Colonial and Post-colonial Geographies of India*, Sage, New Delhi.
15. Singh, Jagdish. (2013). *Bhougolik Chintan Ka Kram Vikas*. Gyanodaya Prakashan, Prayagraj.
16. Singh, R.P.B. (2009). *Uprooting Geographic Thoughts in India: Toward Ecology and Culture in 21st Century*, Planet Earth & Cultural Understanding Series, Pub. 1. Cambridge Scholars Publishing, New Castle upon Tyne, UK.
17. Singh, Ravi S. (ed). (2009). *Indian Geography in the 21st Century: The Young Geographers Agenda*. Cambridge Scholars Publishing, New Castle upon Tyne, UK.
18. Singh, Ravi S. (ed.). (2009). *Indian Geography: Perspectives, Concerns and Issues*, Rawat Publications, New Delhi.
19. Soja, Edward. (1989). *Post-modern Geographies*. Verso. London. Reprinted 1997: Rawat Publ., Jaipur, and New Delhi.

POPULATION GEOGRAPHY

Course Title: Population Geography	**L**	**T**	**P**	**Cr**
Course Code:	4	-	-	4

Type of Course: Major Course/ Minor Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:
CLO1: understand basis concepts of population geography.
CLO2: understand of importance of demographic data.
CLO3: study various aspects of population dynamics.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:
CLO1: nature and scope of population geography and relevance of Demographic data.
CLO2: learn distribution and trends of population growth in the various countries, and also various population theories.
CLO3: dynamics of the population
CLO4: implications of population composition in different regions of the world.

Unit/Hours	**Content**
Unit I / 15 Hours	Nature and scope of population geography; Sources and types of population data: census, sample survey and vital registration system.
Unit II / 15 Hours	World population: growth, causes and consequences; Factors affecting population distribution; Migration: types and determinants; Urbanization: trends and pattern.
Unit III / 15 Hours	Population dynamics: fertility, mortality and morbidity, Composition and structure of population, Occupational structure; Demographic transition theory; human resource development: indicators and patterns.
Unit IV/ 15 Hours	India: Population growth; Distribution of population; Density types; Population problems; Demographic dividend, Population Policy. Role of Ayushman Bharat in quality of life in Bharat.

Suggested/ Recommended readings:

1. Bhende, A. and Kanitkar, T. (2000). *Principles of Population Studies*. Bombay: Himalaya Publishing House.
2. Chandana, R. C. (2015). *Jansankhya Bhugol*. Kalyani Publication, New Delhi.
3. Chandna, R. C. (2006). *Geography of Population*. Kalyani Publishers, New Delhi.
4. Clarke, J.I. (1972). *Population Geography*. Pergamon Press, Oxford.
5. Dube, K.K. and Singh, M.B. (1994). *Jansankhya Bhoogol*. Rawat Publications, Jaipur.
6. Garnier, B.J. (1993). *Geography of Population*. 3rd edition. Longman, London.
7. Namboodiri, N. K. (1996). *A Primer of Population Dynamics*. Springer, New York.
8. Peters, G. L. and Larkin, R.P. (1983). *Population Geography: Problems, Concepts and Prospects*. Kendall/Hunt, Dubuque, IA.
9. Ranade, P. S. (1990). *Population Dynamics in India*. APH Publishing, New Delhi.

10. Srinivasan K. (1998). *Basic Demographic Techniques and Applications*. Sage Publications, New Delhi.
11. Trewartha, G.T. (1985). *A Geography of Population: World Patterns*. John Wiley and Sons, New York.
12. Zelinsky, W. (1966). *A Prologue to Population Geography*. Prentice Hall, New Jersey.

HYDROLOGY AND OCEANOGRAPHY

Course Title: Hydrology and Oceanography	L	T	P	Cr
Course Code:	4	-	-	4
Type of Course: Major Course				
Total Hour: 60 Hours				

Course Learning Objectives (CLO): By studying this course, students would be able to:
CLO1: familiarize with fundamental process in hydrosphere.
CLO2: understand the components and process of the water cycle.
CLO3: impart knowledge on ocean basin topography.
CLO4: develop curiosity and thinking on oceanic process and phenomena.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:
CLO1: explain diverse methods of gaining the hydrological information.
CLO2: explain water cycle and its interaction with human activities.
CLO3: develop the ability to interpret the topographic features of the ocean.
CLO4: develop thinking in oceanic resources and its dynamics.

Unit/Hours	Content
Unit I / 15 Hours	Nature, scope and development of Hydrology; Hydrological cycle; Precipitation: formation process, types; Interception: factors affecting interception loss; Evaporation: process of evaporation, factors affecting evaporation from free water surface and soil,
Unit II / 15 Hours	Infiltration: infiltration process and factors controlling infiltration; Soil moisture and its zones: storage of soil moisture, factors affecting soil moisture storage; Runoff: its sources and components, factors affecting runoff.
Unit III / 15 Hours	Meaning and scope of oceanography; ocean basins: continental shelf, continental slope, deep sea plains, ocean deeps, submarine canyons
Unit IV/ 15 Hours	Physical and chemical properties of sea water: Salinity and Temperature (Horizontal and Vertical Distribution); Circulation of Ocean water: Tides and currents. Marine resources: Petroleum and Natural Gas; Introduction to Marine exploration methods.

Suggested/ Recommended readings:

1. Basu S.K. (2003). *Hand Book of Oceanography*. Global Vision, Delhi.
2. Davis, R. J.A. (1996). *Oceanography: An Introduction to the Marine Environment*. Brown Co, Lowa.
3. Dingman L. S. (2002). *Physical Hydrology*. (2nd ed.). Waveland Press Inc., USA.
4. Garrison, T. (2016). *Oceanography: An Invitation to Marine Science*. (9th ed.), Cengage Learning, Boston.
5. Jain S.K., Agarwal P.K. & Singh V.P. (2007). *Hydrology and Water Resources of India*. Springer, The Netherlands.
6. Lal. D.S. (2003). *Oceanography*. Sharada Pustak Bhavan, Allahabad.
7. Patra K.C. (2011). *Hydrology and Water Resource Engineering*. Narosa Publishing House, New Delhi.
8. Prasad, G. (1998). *Hydrology*. Chadra Prakashan, Gorakhpur. (in Hindi).
9. Pinet, P.R. (2014). *Invitation to Oceanography*. (7th ed.). Jones and Barlett Publishers, Burlington.
10. Raghunath H.M. (2006). *Hydrology*. New Age International (P) Ltd., New Delhi.
11. Rai, S.C. (2017). *Hydrology and Water Resources: A Geographical Perspective*. Ane Book Pvt. Ltd., New Delhi.
12. Rai, V.K. (1993). *Water Resource Planning and Development*. Deep and Deep Publication, New Delhi
13. Reddy, J. P. (1988). *A Textbook of Hydrology*. Laxmi Publication, New Delhi. 4th edition.
14. Sharma, R. C. & Vatal, M. (2018). *Oceanography for Geographers*. Surjeet Publications, Delhi.
15. Singh, M. B. (1999). *Climatology and Hydrology*. Tara Book Agency, Varanasi. (In Hindi).
16. Singh, M.B. (1998). *Jalvayu Avam Samudra Vigyan*. Tara Book Agency, Varanasi.
17. Singh, S. (2015). *Oceanography*. Pravalika Publication, Allahabad.
18. Sverdrup K. A. & Armrest, E. V. (2008). *An Introduction to the World Ocean*. Mcgraw Hill, Boston.

PROJECT-INTEGRATED LAND AND WATER MANAGEMENT

Course Title: Project-Integrated Land and Water Management	**L**	**T**	**P**	**Cr**
Course Code:	-	-	2	2

Type of Course: Major Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: familiar with local problems related to land and water.
CLO2: learn techniques of collecting information related to the problems.
CLO3: gain ground knowledge in land and water management.
CLO4: develop innovation to solve land and water related problems at local level.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: understand and identify local problems related to land and water.
CLO2: develop awareness on local problems.
CLO3: develop skill in land and water management.
CLO4: develop innovation for bringing solution.

Unit/Hours	**Content**
Unit I / 15 Hours	Field based project on land management of university and its surrounding area.
Unit II / 15 Hours	Field based project on water management of university and its surrounding area.

Suggested/ Recommended readings:

1. Adam, M.G. (2000). *Natural Resources Management.* Final Technical Report. Natural Resources Institute, University of Greenwich, U.K.
2. Adams, W. M. (1990). *Green Development: Environment and Sustainability in the Third World.* Routledge and Chapman Hall, London.
3. Alam, S. Manzoor & Kidwai, Habeeb, A. (eds.) (1987). *Regional Imperatives in Utilization and Management of Resources: India and the U.S.S.R.* Concept Publishing Company, New Delhi.
4. Holechek, J. L., Cole, R., Fisher, J., & Valdez, R. (2000). *Natural Resources: Ecology, Economics and Policy.* Prentice-Hall, New Jersey.
5. Mitra, A. (1999). *Resource Studies.* Shridhar Publications, Calcutta.
6. Prasad, H. Et al. (eds.) (2005). *Sustainable Management of Water Resources*, Tara Book Agency, Varanasi.
7. Rao, P. K. (2001). *Sustainable Development: Economics and Policy.* Blackwell Publications, Oxford.

8. Raza, M. (ed.) (1989). *Renewable Resources for Regional Development: The Indian and the Soviet Experience*. Concept Publishing Company, New Delhi.
9. Reid, S. (1995). *Sustainable Development*. Earth scan, London.
10. Singh, M. B. Et. Al. (eds.) (2005). *Sustainable Management of Natural Resources*. Tara Book Agency, Varanasi.
11. Sundaram, K.V.; Mani, M. & Jha, M.M. (eds.) (2004). *Natural Resource Management and Livelihood Security*. Concept Publishing Company, New Delhi.
12. Thakur, B., (ed.) (2003). *Perspectives in Resource Management in Developing Countries*. (I), *Resource Management: Theory and Techniques*. Concept Publishing Company, New Delhi.

INTERNSHIP

Course Title: Internship	**L**	**T**	**P**	**Cr**
Course Code:	-	-	2	2

Type of Course: Internship

Total Hour: 120

Course Learning Objectives (CLO): The objective of the course is to:
CLO1: to prepare the student for a future working life by giving the student possibility to relate his academic skills to work-related tasks.
CLO2: gives the opportunity to learn appropriate professional behavior.
CLO3: provide students with an in-depth knowledge of how a specific organization function.
CLO4: provide an opportunity to apply theoretical knowledge in a realistic work environment.
CLO5: enhance students' overall academic performance.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: summarize the Internship experiences
CLO2: demonstrate the ability to formulate a human geography related problem and actively choose and use relevant tools to solve the problem
CLO3: apply academic skills and accumulate new skills by gaining real world perspective.
CLO4: demonstrate the ability to reflect on and take responsibility for his own working and learning process.

Unit/Hours	Content
	The internship can be carried out in a public or private organisation as well as voluntary organisations. Students had to Write and submit an internship paper. In this paper, student need to relate internship work with knowledge gained in their formal university courses. The paper needs to be focused on academic research (instead of a journal log of your internship tasks). It needs to include academic components with the support of literature references such as journal articles, book chapters, and/or textbook. Paper is expected to be written in1,500 words (plus figures and/tables if necessary) for a 3-credit hour enrollment; or 3,000 words for 6-credit hours.

Suggested/ Recommended readings:

1. Baird, B. N. 2010. Internships, practicum, and field placement handbook, 6th ed. New York: Prentice Hall.
2. Boehm, R. G., and S. Peters. 2008. Careers/jobs in geography: Business cards of department graduates. Texas State University-San Marcos: Department of Geography, Grosvenor Center for Geographic Education.
3. Pereira, Jamilton Costa (2023). Supervised Internship in Geography Teaching. Our Knowledge Publishing.
4. Santos, Ingrid Suzan Alves Dos ; Áurea Nascime De Siqueira M. and Holanda, Tiago Ferna De (2023). Teaching Geography: The Experiences of the Supervised Internship. Our Knowledge Publishing.

SEMESTER-VI

REGIONAL GEOGRAPHY OF WORLD

Course Title: Regional Geography of World	**L**	**T**	**P**	**Cr**
Course Code:	4	-	-	4

Type of Course: Major Course/Minor Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: familiar with the concepts and criteria of regionalization of developed and developing nations.
CLO2: in-depth understanding of Anglo America and Latin America.
CLO3: in-depth understanding of Oceania region.
CLO4: in-depth understanding of Europe.
CLO5: in-depth understanding of Asia and Africa.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: differentiate between developed and developing nations.
CLO2: explain physical-social and economic characteristics of Anglo America and Latin America
CLO3: explain physical-social and economic characteristics of Oceania Region.
CLO4: explain physical-social and economic characteristics of Europe.
CLO5: explain physical-social and economic characteristics of Asia and Africa.

Unit/Hours	**Content**
Unit I / 15 Hours	World Regional Geography- Concept of Region and Regionalization, Nature and Scope of Regional Geography, Regional Geography of Global North and Global South, Critical Analysis of World Development Report
Unit II / 15 Hours	Regional Geography of Anglo America - Geographical setting, physical feature, climate and vegetation, human resource and economic development. Regional Geography of Latin America- Geographical setting, physical feature, climate and vegetation, human resource and economic development. Oceania Region- Geographical setting, physical feature, climate and vegetation, human resource and economic development.
Unit III / 15 Hours	Western Europe- Geographical setting, physical feature, climate and vegetation, human resource and economic development. Eastern Europe- Geographical setting, physical feature, climate and vegetation, human resource and economic development.

	Middle East- Geographical setting, physical feature, climate and vegetation, human resource and economic development.
Unit IV/ 15 Hours	Africa- Geographical setting, physical feature, climate and vegetation, human resource and economic development. South Asia- Geographical setting, physical feature, climate and vegetation, human resource and economic development. South-East Asia- Geographical setting, physical feature, climate and vegetation, human resource and economic development. East Asia- Geographical setting, physical feature, climate and vegetation, human resource and economic development.

Suggested/ Recommended Readings:

1. Bjelland, M., Getis, V. and Getis, A. (2014). *Introduction to Geography*, 14th edition. New York: McGraw Hill.
2. Dickinson, S.P. et al. (1996). *The Geography of the Third World*. Routledge, London.
3. Douglas L . J. (2009). *World Regional Geography*. Tenth edition, Pearson Education Inc, New Jersey.
4. Jones, J. (2011). *World Regional Maps Coloring Book: Maps of World Regions, Continents, World Projections, USA and Canada. United States: CreateSpace* Independent Publishing Platform.
5. Kole, J. (1996). *A Geography of the World's Major Regions*. Routledge, London.
6. Laborde, E. D. (2013). *The World in Outline: A Text-Book of Geography*. United Kingdom, Cambridge University Press.
7. Lewis, M. W. and Wigen, K. E. (1997). *"The Myth of Continents: a Critique of Metageography*. Berkeley: University of California.
8. Lydia, M. P. (2019). *World regional Geography*. Eight Edition, WH Freeman & Co.
9. Majid Husain.(2015). *World Geography*. Fifth edition, Rawat Publications, Jaipur.
10. Manku, D.S. (2013). *A Regional Geography of the World*. Kalyani Publications, Prayagraj.
11. Rai, G. (2007). *Vishwa ka Pradeshik Bhugol*. Mishra Trading Corporation, Varanasi.
12. Richard G. B. (2005). *World Geography*. Eight Edition,McGrawHill Publications.
13. Sharma, P.R. (ed. 1991). *Perspective in Third World Development*. Rishi Publications, Varanasi.
14. Stamp, L.D. (1976). *Asia: A Regional and Economic Geography*, Methuen, London.

HISTORICAL GEOGRAPHY OF BHARAT

Course Title: Historical Geography of Bharat	**L**	**T**	**P**	**Cr**
Course Code:	4	-	-	4

Type of Course: Major Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: understand Bharat as a geographical region

CLO2: learn evolution and development of Bharat.

CLO3: comprehend various dimensions of social formation and economic development of Bharat ancient till contemporary period.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to understand:

CLO1: bharatvarsha as a country and region.

CLO2: formation of Bharat from Janapadas till modern Indian States

CLO3: social and cultural formation of Bharat

CLO4: economic History of Bharat

Unit/Hours	**Content**
Unit I / 15 Hours	Bharat as a Nation: Evolution and development of landscape, boundary, people and society from Vedic to Modern Bharat
Unit II / 15 Hours	Formation of Bharat: evolution and development of Janpadas till present States. Shared history, cultural unitary and Idea of Bharat Mata
Unit III / 15 Hours	Social and cultural formation of Bharat: Tribal, rural and urban communities, origin and development of towns and cities, routes and migration, cultural integration forces -festivals, fairs, folklore and folk songs, pilgrim tourism.
Unit IV/ 15 Hours	Economic history: Ancient, Medieval, British era, post-independence and contemporary period.

Suggested/ Recommended readings:

1. Ahmed, A. (2009). *Geography of the South Asian Subcontinent: A Critical Approach.* Concept Publishing Company, New Delhi.
2. Ali, S.M. (1966).*Geography of Puranas.* People's Publishing House, New Delhi
3. Anjaria, J. S., and McFarlane, C. (eds.).(2011). *Urban Navigations: Politics, Space and the City in South Asia.* Routledge, UK.
4. Batra, A. (2012). *Regional Economic Integration in South Asia: Trapped in Conflict?* Routledge, UK.
5. Deepak, J, Sai. (2021). *India that is Bharat.* Bloomsbury Publisher, India.
6. Hirst, J. G. S., and Zavos, J. (2013). *Religious traditions in Modern South Asia.* Routledge, UK.
7. Jain, B. M. (2010). India in the New South Asia: *Strategic, Military and Economic Concerns in the Age of Nuclear Diplomacy.* IB Tauris, Geneva.

8. Mathur, S. K. (2007). *Global Economic Trends and South Asia*. ICFAI Books, India.
9. Sanyal, S. (2013). *Land of the Seven Rivers*, Penguin publication, India.
10. Sanyal, S. (2015). *The incredible History of Indian Geography*. Puffin publication, India
11. Sanyal, S. (2015). *The Indian Rennaissance: India's Rise After a Thousand Years Decline*. Penguin publication, India

ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

Course Title: Environment and Sustainable Development	L	T	P	Cr
Course Code:	4	-	-	4

Type of Course: Major Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:
CLO1: understand the concept of environment and ecosystem.
CLO2: develop awareness and thinking on environmental problems.
CLO3: understand the role of Indigenous knowledge system in sustainable management.
CLO4: develop thinking on innovation for sustainable management.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:
CLO1: explain the components and functions of ecosystem.
CLO2: develop critical thinking on environmental problems.
CLO3: develop thinking on sustainable practices and innovation.
CLO4: familiar with the role of Indigenous Knowledge System in sustainable management.

Unit/Hours	**Content**
Unit I / 15 Hours	Concept of ecology, environment and environmental geography; Ecosystem; Basic ecological principles and Ecosystem Structure and functions: trophic level, ecological/energy pyramid, food chain and web; Types and characteristics of ecosystem; Biomes and Biodiversity
Unit II / 15 Hours	Environmental problems-Types and causes of Environmental degradation; Environmental pollution: types, causes and impact (Air, Water and Land); Climate change: causes and impact; Dam construction and environmental impact; Environmental issues in local context
Unit III / 15 Hours	Sustainable Development- Concepts and Applicability; Indicators of Sustainable development; International conferences and protocol on

	sustainable development, Sustainable Development Goals (2015 –2030); Practices of sustainable development
Unit IV / 15 Hours	Sustainable management- Ecosystem services; Nature based solution; Sustainable management of water resources; Sustainable management of forests; Sustainable agriculture and food security; Wild life conservation; Indigenous Knowledge System in sustainable management

Suggested/ Recommended readings:

1. Anjaneyulu, Y. (2002). *Environmental Impact Assessment Methodology*. B.S Publications.
2. Blewett, J. (Ed.). (2008). *Understanding Sustainable Development*. Routledge.
3. Brundtland Commission. (1987). *Our Common Future*. Oxford University Press.
4. Chambers, N., Craig, S., & Wackernagel, M. (2004). *Sharing Nature's Interest*. Earthscan Publications Ltd.
5. Dalal-Clayton, B., & Bass, S. (2002). *Sustainable Development Strategies: A Resource Book*. Routledge.
6. Dressner, S. (2002). *The Principles of Sustainability*. Earthscan Publications Ltd.
7. Elliott, L. (2004). *Global Politics of the Environment*. Palgrave MacMillan.
8. Hulse, J. H. (2007). *Sustainable Development at Risk: Ignoring the Past*. Foundation Books.
9. Jain, R. K., et al. (1977). *Environmental Impact Analysis: A New Dimension in Decision Making*. Van Nostrand Reinhold Company.
10. Khoshoo, T. N. (1981). *Environmental Concerns and Strategies*. Ashish Publishing House.
11. Knight, B., Chigudu, H., & Tandon, R. (2002). *Reviving Democracy: Citizens at the Heart of Governance*. Earthscan Publications.
12. Kumra, V. K. (1982). *Kanpur City: A Study in Environmental Pollution*. Tara Book Agency.
13. Lohani, Bindu N. (1984). *Environmental Quality Management*. South Asian Publisher.
14. Mollinga, P., Dixit, A., & Athukorala, K. (Eds.). (2006). *Integrated Water Resources Management*. Sage.
15. Rogers, P. (2007). *An Introduction to Sustainable Development*. Earthscan Publications.
16. Sachs, J. (2015). *The Age of Sustainable Development*. Columbia University Press.
17. Singh, D. N., Singh, J., & Raju, K. N. P. (Eds.). (2003). *Water Crisis and Sustainable Management*. Tara Book Agency.
18. Singh, J. (2009). *Paryavaran aur Samvikas*. Gyanodaya Prakashan.

STATISTICAL TECHNIQUES IN GEOGRAPHY

Course Title: Statistical Techniques in Geography	L	T	P	Cr
Course Code:	2	-	2	4

Type of Course: Major Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: familiar with fundamentals of descriptive and Inferential Statistics.
CLO2: develop skills in statistics software.
CLO3: develop skills in data visualization and interpretation.
CLO4: develop analytical skills using statistical techniques.

Course Learning Outcomes (CLO): At the completion of the course, the students will be able to:

CLO1: understand the basics of statistics and its application in geography.
CLO2: develop skills in statistics software and statistical methods.
CLO3: develop analytical skills in data interpretation using the technique of association and estimation.
CLO4: identify and apply suitable sampling techniques for hypothesis building.

Unit/Hours	**Content**
Unit I / 15	Statistics: Descriptive and Inferential Statistics; Introduction of Nominal, Ordinal, Ratio and Interval data; Introduction of Microsoft Excels; Tabulation; Frequencies; Methods of normalization; Graphs and Diagrams
Unit II / 15	Measures of central tendency: Mean, Median, Mode; Skewness, Kurtosis; Dispersion: Range, Mean deviation and standard deviation; Coefficient of variance; Interpretation of central tendency and dispersion
Unit III / 15	Rank order and product moment correlation; Scatter diagram; Correlation of coefficient; Liner regression; Coefficient of determination; Interpretation of Correlation and Regression
Unit IV / 15	Matrix; Population vs. Sample; Sampling Techniques: Probability sampling methods and non-probability sampling methods; Hypothesis

Suggested/ Recommended readings:

1. Alvi, Z. (2014). *Statistical Geography Methods and Applications*. Rawat Publications.
2. Briggs, W. (2016). *Uncertainty: The Soul of Modeling, Probability & Statistics*. Springer.
3. Burt, J. E., Barber, G. M., & Rigby, D. L. (2009). *Elementary Statistics for Geographers*. Guilford Press.
4. Clark, W. A. V., & Hosking, P. L. (1986). *Statistical Methods for Geographers*. Wiley and Sons.

5. Cole, J. P., & King, C. A. (1968). *Quantitative Geography: Techniques and Theories in Geography* (No. 91: 51 COL).
6. Cressie, N. A. C. (1991). *Statistics for Spatial Analysis*. Wiley.
7. Ebdon, D. (1991). *Statistics in Geography: A Practical Approach-Revised with 17 Programs*. Wiley-Blackwell.
8. Gregory, S. (2014). *Statistical Methods and the Geographer*. Routledge.
9. Hammond, R., & McCullagh, P. (1991). *Quantitative Techniques in Geography*. Clarendon Press.
10. Kurtz, N. R. (1983). *Introduction to Social Statistics*. McGraw-Hill International Book Company.
11. Mahmood, A. (1998). *Statistical Methods in Geographical Studies*. Rajesh Publication.
12. Matthews, J. A. (2013). *Quantitative and Statistical Approaches to Geography: A Practical Manual*. Elsevier.
13. Rogerson, P. A. (2019). *Statistical Methods for Geography: A Student's Guide*. Sage.
14. Sarkar, A. (2000). *Practical Geography: A Systematic Approach*. Orient Blackswan.
15. Sarkar, A. (2013). *Quantitative Geography: Techniques and Presentations*. Orient Blackswan.
16. Silk, J. (1979). *Statistical Techniques in Geography*. George Allen and Unwin.
17. Spiegel, M. R., & Stephens, L. J. (2000). *Theory and Problems of Statistics*. Tata McGraw-Hill Publishing Company Limited.
18. Tayler, P. J. (1977). *Quantitative Methods in Geography: An Introduction to Spatial Analysis*. Houghton Mifflin Company.
19. Walford, P. (1995). *Geographical Data Analysis*. John Wiley and Sons Inc.
20. Yeates, M. (1974). *An Introduction to Quantitative Analysis in Human Geography*. McGraw-Hill.

SEMESTER VII

AGRICULTURAL GEOGRAPHY

Course Title: Agricultural Geography	**L**	**T**	**P**	**Cr**
Course Code:	4	-	-	4

Type of Course: Major Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:
CLO1: familiar with fundamental approaches of agricultural geography.
CLO2: learn various techniques to analysis cropping pattern and production.
CLO3: in-depth understand with different methods in agriculture.
CLO4: develop thinking on contemporary issues and strategies of agriculture in Bharat.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:
CLO1: explain geographical factors affecting agriculture in a region.
CLO2: understand and analyse different methods and measurements used in agriculture.
CLO3: explain the agricultural land use and land capability in India.
CLO4: update knowledge of contemporary issues and strategies in agriculture.

Unit/Hours	**Content**
Unit I / 15 Hours	Agricultural Geography; Meaning and Scope; Geographical Factors affecting Agriculture: Physical, Economic, Technological, Institutional and socio-cultural.
Unit II / 15 Hours	Cropping patterns and their measurements; crop concentration, crop diversification, crop combinations, measurement of agricultural efficiency, agricultural productivity; Agricultural location models: Von Thunen and Lösch.
Unit III / 15 Hours	Agricultural land-use and carrying capacity; Land-use classification (British and Indian). Land capability classification (U.S. and Britain). Diffusion of agricultural innovations; Green revolution and its effects on economy, society and environment.
Unit IV/ 15 Hours	Agro-climatic regions of Bharat- Delimitations and Salient features, Agro-ecological regions of Bharat-Delimitations and Salient Features Measurement and levels of agricultural development; Issues and Challenges of contemporary of Indian agriculture. Emerging Perspectives in Agriculture and Government Initiatives: Sustainable agriculture, food security and safety.

Suggested/ Recommended readings:

1. Anand R.K., (2021 edition). *Agricultural Geography*. Mangalam Publications.
2. Burch, D., Gross, J. & Lawrence, G. (1999). *Restructuring Global and Regional Agriculture*. Ashgate Publishing Company, Burlington.

3. Cakmak, I. And Welch, R. M. (2009). *Impacts of agriculture on Human Health and Nutrition.* EOLSS Publications, UK.
4. Gautam, A. (2023). *Agriculture Geography.* Sharda Pustak Bhawan, Prayagraj.
5. Gautam, A. (2021). *Krishi Bhugol.* Sharda Pustak Bhawan, Prayagraj.
6. Grigg, D.B. (1984). *Introduction to Agricultural Geography.* Hutchinson, London.
7. Hussain, M. (2006). *Systematic Agricultural Geography.* Reprinted, Rawat Publications, Jaipur.
8. Hussain, M. (2020 ed.). *Agricultural Geography.* Rawat Publications Jaipur India.
9. Kulkarni, M. (2017). *Agricultural Geography.* Indian Books and Periodicals.
10. Misra, R. P. (1967). *Diffusion of Agricultural Innovations.* University of Mysore, Mysore.
11. Mohammad, A. (1978). *Studies in Agricultural Geography.* Rajesh Publications, New Delhi
12. Mohammad, N. (1992). *New Dimension in Agriculture Geography.* (I to VIII), Concept Publishing Company, New Delhi.
13. Mohammad, N. And Rai, S.C. (2014). *Agricultural Diversification and Food Security in the Mountain Ecosystem.* Concept Publishing Company, New Delhi.
14. Sen, S. (1975). *Reaping the Green Revolution.* Tata mcgraw-Hill, New Delhi
15. Shafi, M. (2006). *Agricultural Geography.* Pearson Education, New Delhi.
16. Singh, B. N. (1988). *Integrated Rural Area Development and Planning.* Anupama Publications., Delhi.
17. Singh, B.B. (1979). *Krishi Bhugol.* Tara Publications, Varanasi.
18. Singh, J., & Dhillon, S.S. (1994). *Agricultural Geography,* Tata mcgraw Hill, New Delhi.
19. Singh, S. (1994). *Agricultural Development in India: A Regional Analysis.* Kaushal Publications, Shillong.
20. Singh, K.N. (2004). *Agricultural Geography in India.* Sunrise Publications.
21. Singh, R. B. (2000). *Environmental Consequences of Agricultural Development: A Case Study from the Green Revolution state of Haryana, India.* Agriculture, Ecosystems and Environment.
22. Tiwari, R. & Singh, B. (1994). *Krishi Bhoogol.* Prayag Pustak Bhandar, Allahabad. (Hindi)

DISASTER MANAGEMENT

Course Title: Disaster Management	**L**	**T**	**P**	**Cr**
Course Code:	3	1	-	4

Course type: Major Course/Minor Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: familiar with disasters and hazards at the local and global scale.
CLO2: understand different phases of disaster management.
CLO3: familiar with recent technologies and policies in disaster management.
CLO4: develop critical thinking on disaster problems and disaster innovation.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: understand the concept of disaster and hazard.
CLO2: explain the phases of disaster management.
CLO3: update with the latest advancements in technologies and policies related to disaster management.
CLO4: develop critical thinking on disaster problems and its solution at the local level.

Unit/Hours	**Content**
Unit I / 15 Hours	Concept of Disaster and Hazards; Types of Hazards; Multi-hazard; Physical dimension of Hazard; Spatial distribution of hazards at global, national and local level
Unit II / 15 Hours	Vulnerability: Definition, types, measures of vulnerability; Risk: Definition, Components of risk, risk perception, risk reduction, risk communication; Resilience: Definition; Themes in resilience studies (biophysical attribute, social attribute, social-ecological system (SES) attribute, attribute of specific area)
Unit III/ 15 Hours	Concept of Disaster management; Disaster management cycle: Pre disaster management stage (preparedness, prevention, mitigation), On disaster management stage (Emergency response and management), Post disaster management stage - Relief, Recovery, Rehabilitation; Community based disaster management; Institutions in Disaster management
Unit IV/ 15 Hours	Early warning systems and hazard monitoring; hazard, vulnerability, and risk mapping; Geo-informatics in damage assessment; Geo-informatics in emergency management; Participatory GIS (Geographic Information System) mapping; Introduction of Web GIS and apps in disaster management; Indigenous Knowledge System in Disaster Management; Sendai Framework for disaster risk reduction; Ten Point Agenda on DRR

Suggested/ recommended readings:

1. Alexander, D. (2018). *Natural Disasters*. Routledge.
2. Carter, W. N. (1999). *Disaster Management: A Disaster Management Handbook*. ADB.
3. Coch, N. K. (1994). *Geohazards: Natural and Human*. Prentice-Hall.
4. Drabek, T. E. (2018). *The Human Side of Disaster*. CRC Press.

5. Hyndman, D., & Hyndman, D. (2016). *Natural Hazards and Disasters*. Cengage Learning.
6. Keller, E. A., & DeVecchio, D. E. (2016). *Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes*. Routledge.
7. Smith, K. (2013). *Environmental Hazards: Assessing Risk and Reducing Disaster*. Routledge.
8. White, G. F. (1974). *Natural Hazards, Local, National, Global*. Oxford University Press.
9. Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2014). *At Risk: Natural Hazards, People's Vulnerability and Disasters*. Routledge.
10. National Institute of Disaster Management. Retrieved from nidm.gov.in
11. Center, A. D. R. (2015). *Sendai framework for disaster risk reduction 2015-2030*. United Nations Office for Disaster Risk Reduction: Geneva, Switzerland.

RESEARCH ETHICS AND METHODOLOGY

Course Title: Research Ethics and Methodology	L	T	P	Cr
Course Code:	4	-	-	4

Type of Course: Major Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: understand basic concepts of field research and research design in geography.
CLO2: understand field work through practical experience and get skills of data collection methods and processing and analysis of obtained data.
CLO3: write dissertation based on field work on given topic.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: understand basic concepts of field research methods and research design in geography.
CLO2: do field work through practical experience and get skills of data collection methods and processing and analysis of obtained data.
CLO3: write dissertation based on field work on given topic.

Unit/Hours	**Content**
Unit I / 15 Hours	Conceptual framework: Nature of scientific research. Introduction to Geographical Research: Concept, Significance, Types and Approaches to Research in Geography; Literature survey; research proposal framework, referencing/bibliography; Research Ethics; Limitations.

Unit II / 15 Hours	Research Design: Steps, Identification and formulation of Research Problem; Research questions; Hypothesis formulation, Objectives formulation and research methodology.
Unit III / 15 Hours	Data Sources and Methods of Data Collection: Nature of Data: qualitative and quantitative, Primary Data: Field survey, Selection of sample, Questionnaire (Open/ Closed / Structured / Non-Structured); Interview with Special Focus Group Discussions; Observation (Participant / Non-Participant), Space Survey (Transects and Quadrants, Constructing a Sketch & Mental map); Secondary Data, Data Representation Techniques
Unit IV/ 15 Hours	Data Analysis: Processing of Data; tabulation, graphic presentation and analysis of Data; Referencing; Designing the Dissertation & Field Report – Aims and Objectives, Methodology, Analysis, Interpretation and Writing the Dissertation & Report.

Suggested/ Recommended readings:

1. Ahuja, R. (2001). *Research Methods.* Rawat Publications, Jaipur and New Delhi.
2. Bhattacharyya, D. K. (2005). *Research Methodology.* Excel Books, New Delhi.
3. Black, J. A. and Champion, D.J. (1976). *Methods and Issues in Social Research.* John Wiley and Sons, New York.
4. Creswell, J. (1994). *Research Design: Qualitative and Quantitative Approaches.* UK: Sage Publications.
5. Dikshit, R. D. (2003). *The Art and Science of Geography: Integrated Readings.* New Delhi, India: Prentice-Hall of India.
6. Evans, M. (1988). Participant Observation: The Researcher as Research Tool. In Eylesand, J and D. Smith (eds). *Qualitative Methods in Human Geography.* Cambridge, UK: Polity.
7. Gopal, K. and Singh, N. (2016). *Researching Geography:The Indian Context.* Routledge, Delhi.
8. Kothari, C. R. (2004). *Research methodology: Methods and techniques.* New Age International.
9. Kumar R. (2010). *Research Methodology: A step-by-step Guide for Beginners,* Sage Publications, Ltd. London.
10. Misra, R. P. (2015). *Research Methodology: A Handbook.* Concept Publishing Company, New Delhi.
11. Mukherjee, N. (1993). *Participatory Rural Appraisal: Methodology and Application.* Concept Publication, Delhi, India.

URBAN GEOGRAPHY

Course Title: Urban Geography	L	T	P	Cr
Course Code:	4	-	-	4

Type of Course: Major Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: familiarize with the basic theoretical concepts related with urban geography.
CLO2: develop the understanding of process and related problem of urbanization.
COL3: develop the understanding of urban planning, policies and strategies for urban planning.
COL4: acquaint students with the recent research methodologies in urban studies.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: understand theoretical framework of the cities.
CLO2: examine the contemporary issues of urban areas from planning perspective
CLO3: understand the impact various urban policies/Governance on Indian cities.
CLO4: validate the theories and models by understanding the application aspect using Remote Sensing and GIS techniques in urban planning.

Unit/Hours	Content
Unit I / 15 Hours	Definition, Nature and Scope of Urban Geography; Approaches and Recent trends in Urban Geography; Classification of Urban Places; The Urban Economic Base Concept; The City's spheres of influence; Rural-Urban Fringe
Unit II / 15 Hours	Process and the Problems of Urbanization in Bharat- The Origins and Growth of Cities in India; Urban Pollution and Health Issues; Rural-Urban Migration; Urban Slums; Urban Crime; Housing and Poverty; Urban Land Use; Urban Encroachment; Urban Heat Island, Urban Micro Climate, counter urbanization
Unit III / 15 Hours	Urban Planning, Policies and Governance-Urban Planning and Silent Features in Bharat; Urban Development Programmes- Smart Cities, AMRUT, HARIDAY, Satellite Towns; National Policies of Urbanization
Unit IV/ 15 Hours	Research Methods in Urban Geography-Models for Internal Structure; Hierarchy and Spacing of Cities; Urban Sprawl; Application of Geospatial Techniques in Urban Environment Planning, Monitoring and Management.

Suggested/ recommended readings:

1. Carter, H. (1972). *The study of urban geography*. London: Edward Arnold.

2. Choley, R.J. and Haggett, P. (1966). *Models in geography*. London: Methuen.
3. Fyfe, N. and Kenny, J. (Eds.) (2005). *The urban geography reader*. London: Routledge.
4. Gibbs, J.P. (1961). *Urban research methods*. New Jersey: Princeton University Press.
5. Gilbert and Joseph G. (1982). *Cities, poverty and development-urbanization in the 3rd world*. Oxford: Oxford University Press.
6. Hall, P. (1992). *Urban and regional planning*. London: Routledge.
7. Kumari, Kiran (2013). *Eastern Uttar Pradesh: A study in urban geography*. Ayushman Publication, New Delhi.
8. Kumari, Kiran (2013). *Urbanization in Eastern Uttar Pradesh*. Ayushman Publication, New Delhi.
9. Pacione, M. (2009). *Urban geography: a global perspective*. Oxford: Routledge.
10. Ramachandran, R. (2005). *Urbanization and urban systems in india*. Oxford University Press.
11. Schwanen, T. and Van Kempen, R. (eds.) (2019). *Handbook of urban geography*. Cheltenham: Edward Elgar Publishing.
12. Shen, Z. (2012). *Geospatial techniques in urban planning*. Verlag: Springer Science & Business Media.
13. Short, J.R. (2017). *An introduction to urban geography*. Oxford: Routledge.
14. Siddhartha, K. and Mukherjee, S. (2016). *Cities, urbanisation and urban systems*. New Delhi: Kitab Mahal Publisher.

SEMESTER-VIII

SPATIAL PLANNING AND MANAGEMENT

Course Title: Spatial Planning and Management	**L**	**T**	**P**	**Cr**
Course Code:	4	-	-	4
Type of Course: Major Course/ Minor Course				
Total Hour: 60 Hours				

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: contextualize the concepts related to spatial planning and management.
CLO2: promote anunderstanding of models of spatial planning.
CLO3: give a proper orientation about the role and functions ofmanagement, theories of spatial management.
CLO4: develop strategies for understanding various developmental plans & policies related to spatial planning and management.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: explain the spatial planning and management.
CLO2: incorporate Models and theories of spatial planning and practices into their work.
CLO3: distinguish the regions for proper spatial planning.
CLO4: critically evaluate the developmental plans for specific purposes.

Unit/Hours	**Content**
Unit I / 15 Hours	Spatial Planning and management- Concept of Space and Spatial Relations; Concept of Spatial Planning; Planning Process; Measures of effective Planning; Concept of Management, Functions of management, Management roles, Levels of Management, Management Skills
Unit II / 15 Hours	Models of Spatial Planning- Rational Planning Model; Advocacy Planning Model; Political Economy Model; Equity Planning Model; Radical Planning Model; Collaborative Planning Model Concentric Zone Theory - Sector Theory - Multiple Nuclei Theory - Land Use and LandValue Theory; From World city through Global city to Cities in a World of Cities
Unit III / 15 Hours	Agglomerations and Regions- Cities, metropolis mega cities, metropolitan agglomerations, conurbations, and metropolitan regions, per-urban areas and extended metropolitan region; Desakota model and territoriality of rural-urban interactions
Unit IV/ 15 Hours	Framework for Planning law and its interface with Development- Evolution of town planning legislation and laws, town planning as a State subject; 73rd and 74th amendment and its implications for planning law; Current amendments in Planning and Development laws related to environment, heritage, housing, real estate and property law

Suggested / Recommended readings:

1. Allmendinger, P. (2017). *Planning theory*. Macmillan. London.
2. Fainstein, S. S. and De, Filippis J. (Eds.) (2016). *Readings in planning theory*. Wiley. London.
3. Friedmann, J. (1987). *Planning in the public domain*. Princeton University Press. Princeton.
4. Glasson John and Marshall Tim, (2007). *Regional Planning*. Taylor and Francis. London. NewYork.
5. Government of India (2014). *URDPFI Guidelines*. Ministry of Housing and Urban Affairs. New Delhi.
6. Hall Peter & Tewdwr-Jones Mark (2010). *Urban and regional planning*. Routledge, London andNew York.
7. Kapur, Anu. (2015). *Made only in India: goods with geographical indications*. Routledge.
8. Kennedy, K. (2007). *Regional industrial policies driving peri-urban dynamics in Hyderabad, India Cities*. Vol.24. No. 2, pp. 95–109.
9. Khullar, D.R. (2008). *India: a comparative geography*. Kalyani Publishers, New Delhi.
10. King, A. (1976). *Colonial urban development: culture, social power, and environment*. Routledge andKegan Paul, New York.
11. Kulshreshta, S. K. (2012). *Urban and regional planning in India: a handbook for professional practice*. Sage,New Delhi.
12. Kumar, A. (2006). *Trends of planning and governance in metropolitan India. ITPI Journal*, Vol. 3, No. 2. pp. 10-20.
13. Kumar, A.; Sanjeev, V. & Prakash, P. (2020). *City planning in India. 1947-2017*, Routledge, NewYork.
14. Lichfield N.; Kettle P. & Whitbread M. (2016). *Evaluation in the planning process: the urban andregional planning series*. Vol. 10. Elsevier.
15. McAuslan, P. (2019). Bringing the law back in: essays in land, law and development. Routledge.London.
16. McKinsey & Company Inc. (2013). *Reimagining India: unlocking the potential of Asia's next superpower*.Simon & Schuster.
17. Miraftab, F. & Kudva, N. (2014). *Cities of Global South*, Routledge, London.
18. Mitra, S. (2017). *A 'peripheries' view of planning failures in Kolkata and Hyderabad in India*. in G. Bhan; S. Srinivas, & V. Watson (eds.) *The Routledge Companion to Planning in the Global South*. Routledge, London.
19. RahmaanA. U. (2011). *The imperatives of urban and regional planning: Concepts and case studies from the developing world*, Xlibris Corporation.
20. Singh, Jagdish (1979). *Central places and spatial organization in backward economy*. Uttar Bharat Bhoogol Parishad. Gorakhpur.

POLITICAL GEOGRAPHY

Course Title: Political Geography	**L**	**T**	**P**	**Cr**
Course Code:	4	-	-	4

Type of Course: Major Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: familiarize the nature of Political Geography.
CLO2: acquaint the students with the concept of nation and state.
CLO3: identify the significance of theories and their prominence in political power.
CLO4: aware students from emerging political challenges and their impact on the political spectrum.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: broadens the understanding of nature and scope of Political Geography.
CLO2: conceptualize the understanding and the relevance of geographical peculiarities determining Bharat as a territory (Political unit).
CLO3: comprehend the spatial processes involved in electoral geography.
CLO4: determine the geographical factors that affect the election results.

Unit/Hours	**Content**
Unit I / 15 Hours	Political Geography- Nature and Scope of Political Geography, Political Geography as the Politics of Place; Evolution and Development of Geography; Recent trends in Political Geography; Contribution of German, British and American Scholars.
Unit III 15 Hours	Nation and State- Concept and components of Nation, State and Nationhood; Geopolitics; politics of world resources; Geo-strategic views: Mahan, Mackinder, Spykman, and Deseveresky; Geopolitical World Orders; Formation of Frontiers and Boundaries, Border Lands, Buffer States and Land-Locked State. Geopolitical Setting of Bharat; Significance of Indian Ocean; International law of the sea; Evolution of Cooperative Federalism, Concept of first village, Geographical study of Border areas
Unit III / 15 Hours	Electoral Geography- methods of studying electoral geography, Geographical influence in voting, Concept of 'One Nation, One Election'. Geography of Electoral support and Representation: Constituencies and their evolution. Case Studies of Indian Elections. Reading the emerging politico electoral regions of India.
Unit IV/ 15 Hours	Geographical Factors in Bharat's Political Spectrum- Role of terrain, Rivers and sea coasts in shaping political history; Geography of internal conflicts and problems of Nation Building: Religious and linguistics conflicts, separatist movements, river water disputes. The International Boundary of Bharat and

	related issues. Bharat's political alliance. Regional Co-operations – SAARC, ASEAN and G-20.

Suggested/ recommended readings:

1. Adhikari, S. (1997). *Political geography*. Rawat publications, Jaipur and Delhi.
2. Adhikari, S. (2005). *Political geography of India*. Sharada Pustak Bhawan. Allahabad.
3. Agnew, J. (2002). *Making political geography*. Arnold, London.
4. Agnew, J.; Mitchell, K. & Toal, G. (eds.) (2003). *A companion to political geography*. Blackwell, Oxford.
5. Cohen, S. (1964). *Geography and politics in a world divided*. Random House. NY.
6. Cox, K. R. (2002). *Political geography: territory, state and society*. Wiley-Blackwell. Chichester.
7. Cox, K.R.; Low, M. & Robinson, J. (2008). *Handbook of political geography*. SAGE Publications Ltd. London.
8. Deshpande, C.D. (1992). *India: a regional interpretation*, I.C.S.S.R, New Delhi.
9. Dikshit, R. D. (1989). *Political geography: a contemporary perspective*. Tata Mc Graw Hill. New Delhi.
10. Dikshit, R. D. (2000). *Political geography: a contemporary perspective*. Prentice-Hall, New Delhi.
11. Dikshit, S. K. (2007). *Rajnitik bhoogol avam bhurajniti*. Vishwavidyalaya Prakashan. Varanasi.
12. Dixit, R. D. (1987). *Political geography and geopolitics*. Tata McGraw Hill. New Delhi.
13. Dwivedi, R.L. (1980). *Political geography*. Chaitanya Publishing House. Allahabad.
14. Gallaher, C.; Dahlman, C.T.; Gilmartin, M.; Mountz, A. & Shirlow, P. (2009). *Key Concepts in Political Geography*. SAGE Publications Ltd. London.
15. Glassner, M. (1993). *Political geography*. John Wiley & Sons. New York
16. Glassner, M.L. & Blij, H.J.de (1968). *Systematic political geography*. John Wiley. New York.
17. John, R. S. (2002). *An introduction to political geography*. Taylor & Francis.
18. Jones, M. (2004). *An introduction to political geography: space, place and politics*. Routledge. London.
19. Painter, J. and Jeffrey, A. (2009). *Political geography*. SAGE Publications Ltd. London.
20. Painter, Joe (1995). *Politics, geography and 'political geography': a critical perspective*. London: Arnold.
21. Pannikar, K. N. (1955). *Geographical factors in India's history*. Bharatiya Vidya Bhavan, Bombay.
22. Prescott, J. R. V. (1972). *The political geography*. Methuen. London.
23. Sinha, Manorama (1995). *Political geography*. Horizon Publication. Prayagraj.
24. Taylor, P. & Flint, C. (2000). *Political geography*. Pearson Education. Harlow. Essex
25. Weiner, M. & Osgoodfield, J. (1975). *Electoral politics in the Indian states*, Centre for International Studies, MIT.

GEOGRAPHY OF TRANSPORT

Course Title: Geography Of Transport	**L**	**T**	**P**	**Cr**
Course Code:	4	-	-	4

Type of Course: Major Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

1. develop understanding of transport geography
2. comprehend dynamics of regional and urban transport
3. understand issues, challenges and management of urban transportation.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

1. detailed understanding of transport geography and spatial dimension with space economy.
2. learn about regional transportation and measurement of regional connectivity
3. understand urban transportation system and its challenges in major cities of India
4. understand urban transport management with the help of case studies.

Unit/Hours	**Content**
Unit I / 15 Hours	Transport Geography-Definition and Scope, Means and Modes of Transport in Bharat; History of transport expansion in Bharat, dynamic relationship between transport and spatial readjustment, role of transport as a lead sector.
Unit II / 15 Hours	Dynamics of Regional Transport- Factors related to regional transport expansion, Concept and various measures of accessibility and connectivity, graph theory, transport and regional structure of Bhartiya Economy. Regional Connectivity - Bullet train, Expressways, Waterways, Freight Corridor.
Unit III / 15 Hours	Urban Transport- Characteristics of urban transport, Profile of urban transport facilities, traffic in towns, transport services and urban land use pattern, role of intermediary transport modes, modal split, issues and challenges of urban transport.
Unit IV/ 15 Hours	Metropolitan Transport Management-Landuse planning, Integrated Transport Planning, Strengthening Public Transport System, Integrated Fare Collection System, e-governance. Case studies: Delhi & Ahmedabad. Recent Developments in Urban Transportation system - BRTS, RRTS, Metrorail, Skybus, hyper loop, pod taxi.

Suggested/ Recommended readings:

1. Berry, B. J. L., Marble, D. F., & Blumenfeld, H. C. (1966). *Essays on Commodity Flow and Spatial Structure of Indian Economy*. Department of Geography, University of Chicago.

2. Berry, B.L.J. & Marble, D.F. (eds.) (1979). *Spatial Analysis: A Reader in Statistical Geography*. Prentice Hall.
3. Cooley, C.H. (1994). *The Theory of Transportation*, in Hurst, M.E. (ed.) Transportation geography: Comments and Reading. Mc Graw Hill, 15-29.
4. Singh, K.N. (2003). *Transport Geography*. Gyanodaya Prakashan, Gorakhpur.
5. Singh, K.N. (1988). *Transport Network in Rural Development*. Institute of Rural Ecodevelopment, IRED, Gorakhpur.
6. Gautam, P.S. (1992). *Transport Geography of India: A Study of Chambal Division, M.P.* Mittal Publications, New Delhi.
7. Haggett, P. (1965). *Locational Analysis in Human Geography*. London.
8. Haggett, P. & Chorley, R.J. (1969). *Networks Analysis in Geography*. London.
9. Kansky, K.J.(1963). *Structure of Transportation Networks: Relationships between Network Geometry and Regional Characteristics*, University of Chicago, Department of Geography, Research Paper, Chicago, 84.
10. Nagar, V.D. & Gautam S. (1964). *Principles and Problems of Indian Transport*. Kailash Pustak Sadan, Gwalior.
11. Owen, W. (1968). *Distance and Development: Transport and Communications in India*. Washington.
12. Raza, M. &Aggarwal, Y. (1986). *Transport Geography of India*. Concept Publishing Company, New Delhi.
13. White, H. P. &Senior, M.L. (1983). *Transportation Geography*. Longman Inc. New York.
14. Ashton, W.D.(1966). *The Theory of Traffic Flow*. Methuen, London.

RURAL DEVELOPMENT

Course Title: Rural Development	L	T	P	Cr
Course Code:	4	-	-	4

Type of Course: Major Course

Total Hour:60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: develop understanding of rural development in Bharat

CLO2: understand historical perspective, economic and socio-cultural dimension of rural development in Bharat.

CLO3: Understand various issues and challenges related to rural development and government polices related to it.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: comprehend rural development concept and theories.

CLO2: gain knowledge on rural economic base especially about the significance of development of non-farm sector in rural areas,

CLO3: acquire in-depth knowledge of pre and post-independence period of rural development.

CLO3: sensitize to understand the relevance of access to services like health, education in rural areas.

Unit/Hours	**Content**
Unit I / 15 Hours	Rural Development in Bharat– Definition, Need and Approaches to Rural Development;Theories of rural development, Concept of Provision of Urban Amenities to Rural Areas (PUARA), Integral Humanism and rural development
Unit II / 15 Hours	Rural Development in pre-Independence Bharat, Post-Independence- Review of Rural Development's Plans and its impact during five-year plans. Different dimensions of rural development- Area based Approach, Target Group Approach and Integrated Rural Development Approach.
Unit III / 15 Hours	Rural Economic Base- infrastructure and rural development, agriculture and rural development, agro-industries, rural entrepreneurship, and rural development, Government Policies and Programmes for Rural Development, Information Technology and Rural Development.
Unit IV/ 15 Hours	Provision of Services: Access to Elementary education in rural areas, Access to Primary Health Care in rural India, Micro Credit, Village resource centres Different institutions of rural development, Indicators of rural development, Atamanirbhar Village for Atamanirbhar Bharat

Suggested/ Recommended readings:

1. Desai, A. R. (1990). *Rural Development*, Popular Prakashan, Bombay.

2. Gilg, A. W. (1985). *An Introduction to Rural Geography.*Edwin Arnold, London.
3. Krishnamurthy, J. (2000). *Rural Development - Problems and Prospects.* Jaipur, India: Rawat Publs.
4. Krishnamurthy, J. (2000). *Rural Development: Problems and Prospects*, Rawat Publications, New Delhi.
5. Lee, D. A. & Chaudhri, D. P. (eds.) (1983). *Rural Development and State.* Methuen, London.
6. Misra, R. P. (ed.) (1985). *Rural Development: Capitalist and Socialist Paths.* Concept, New Delhi.
7. Palione, M. (1984). *Rural Geography.* Harper and Row, London.
8. Ramachandran, H., and Guimaraes, J.P.C. (1991). *Integrated Rural Development in Asia–Leaning from Recent Experience.* New Delhi, India: Concept Publishing.
9. Robb, P. (1983). *Rural South Asia: Linkages, Change and Development.* Curzon Press, UK.
10. Sharma, K.K& Singh, M. (2014).*Perspective of Regional Development.* Research India Press, New Delhi.
11. Sharma, K.K., Tripathi, A.K., Yadav, A., and Singh, M. (2017). *Rural Development: A Holistic Perspective.* Research India Press, New Delhi.
12. Singh, R.B. (1985). *Geography of Rural Development.* New Delhi, India: Inter India.
13. UNAPDI (1986). *Local Level Planning and Rural Development: Alternative Strategies*, United Nations Asian and Pacific Development Institute, Bangkok. Concept Publishing Company, New Delhi.
14. UNAPDI. (1986). *Local Level Planning and Rural Development: Alternative Strategies.*New Delhi, India: (United Nations Asian & Pacific Development Institute, Bangkok), Concept Publs. Co.
15. Yugandhar, B. N. and Mukherjee, N. (eds.). (1991). *Studies in Village India: Issues in Rural Development*, Concept Publishing Company, New Delhi.

SEMESTER IX

ADVANCED GEOMORPHOLOGY

Course Title: Advanced Geomorphology	L	T	P	Cr
Course Code:	3	-	1	4

Type of Course: Major Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO1: understand the tectonic landforms and its evolution.

CLO2: understand and evaluate modern theories of landscape evolution.

CLO3: develop analytical skill through learning the different techniques of drainage morphometry.

CLO4: develop thinking on application of geomorphology in real world scenario.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: identify and interpret geotectonic landform.

CLO2: evaluate modern theories and models of landscape evolution by comparing and observing the world.

CLO3: interpret and analysis drainage morphometry.

CLO4: develop thinking on contemporary geomorphological issues for solving problems.

Unit/Hours	**Content**
Unit I / 15 Hours	Tectonic landforms: Origin of hot spot; Landform evolution in horizontal, uncinal and folded structure; Interpreting geological maps; Interpreting tectonic features in local context
Unit II / 15 Hours	Modern theories of landscape evolution: Dynamic Equilibrium; The geomorphic system; Hill slope evolution; Geo-climatic region
Unit III / 15 Hours	Drainage systems; Drainage patterns; River capture; Concept of drainage basin; Channel geometry; Hydraulic geometry; Channel bed topography; Channel types and pattern; Interpreting drainage and channel in local areas
Unit IV/ 15 Hours	Concept of Applied geomorphology; Landslide hazard and mitigation measures; Flood hazard and mitigation measures; Geomorphology in engineering construction; Geomorphology in ground water management; River basin management

Suggested/ Recommended readings:

1. Anderson, R. S., & Anderson, S. P. (2010). *Geomorphology: The Mechanics and Chemistry of Landscapes*. Cambridge University Press.
2. Bierman, P. R., & Montgomery, D. R. (2014). *Key Concepts in Geomorphology*. Macmillan Education.
3. Bloom, A. L. (2003). *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*. Prentice-Hall of India.
4. Dayal, P. (1994). *A text book of Geomorphology*. Kalyani Publishers, New Delhi.
5. Huggett, R. J. (2011). *Fundamentals of Geomorphology*. Routledge.

6. Kale, V. S., & Gupta, A. (2001). *Introduction to Geomorphology*. Orient Longman.
7. Kearey, P., Klepeis, K. A., & Vine, F. J. (2009). *Global tectonics*. John Wiley & Sons.
8. Liang, S. (2004). *Quantitative Remote Sensing of Land Surfaces*. Wiley.
9. Singh, S. (2000). *Geomorphology* (in Hindi). Vasundhra Prakashan.
10. Singh, S. (2004). *Geomorphology*. Prayag Pustak Bhawan.
11. Sparks, B. W. (1986). *Geomorphology*. Longmans.
12. Summerfield, M. A. (1988). *Global tectonics and landform development*. Progress in physical geography, 12(3), 389-404.
13. Thornbury, W. D. (2005). *Principles of Geomorphology*. John Wiley and Sons.
14. Verma, V. K. (2023). *Geomorphology*. Rawat Publications.
15. Wooldridge, S. W., & East, W. G. (1951). *The Spirit and Purpose of Geography: Geography Series*. Hutchinson University Library.

ADVANCED REMOTE SENSING AND GIS

Course Title: Advanced Remote Sensing and GIS	**L**	**T**	**P**	**Cr**
Course Code:	2	-	2	4

Course type: Major Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:
CLO1: develop skills in Remote Sensing Software and Image interpretation.
CLO2: enhance skills in GIS software and spatial data analysis.
CLO3: generate geohydrological maps using Digital Elevation Model (DEM).
CLO4: prepare reports using geospatial technology.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:
CLO1: develop skills in Remote Sensing.
CLO2: enhance proficiency in data analytics through the utilization of GIS.
CLO3: learn Digital Elevation Model (DEM) and geohydrological mapping.
CLO4: develop skills to prepare reports using geospatial technology.

Unit/Hours	**Content**
Unit I / 15 Hours	Remote Sensing- Interpreting band of satellite images; Band extract and layer stack of satellite images; Subset and Mosaic; LULC mapping using Supervised and Unsupervised classification; NDVI mapping; Land surface temperature mapping; Change detection using multitemporal satellite images
Unit II / 15 Hours	GIS -Thematic mapping through digitization; Creation of attribute table and map generation; Interpolation and extrapolation techniques; Buffer analysis; Suitability analysis using weighted overlay

Unit III/ 15 Hours	Digital Elevation Model (DEM) for Geohydrology-Preparing DEM using contour, spot heights and satellite images; Slope and Aspect mapping; Drainage mapping; Flow direction and Stream order mapping; Watershed delineation
Unit IV/ 15 Hours	Report -Field based Report using Remote sensing, GIS and GPS techniques within university and surrounding of university

Suggested/ Recommended readings:

1. Burrough, P. A., & McDonnell, R. A. (1998). *Principles of Geographic Information Systems*. Oxford University Press.
2. Chang, K.-t. (2006). *Introduction to Geographic Information Systems*. Tata McGraw-Hill.
3. DeMers, M. (2009). *Fundamentals of Geographic Information Systems (4th ed.)*. John Wiley & Sons.
4. Heywood, I., Cornelius, S., & Carver, S. (2011). *An Introduction to Geographic Information Systems*. Pearson Education.
5. Longley, P. A., Goodchild, M., Maguire, D. J., & Rhind, D. W. (2010). Geographic Information Systems and Science. Wiley.
6. Canty, M. J. (2014). *Image Analysis, Classification and Change Detection in Remote Sensing*. CRC Press.
7. Lavender, S., & Lavender, A. (2015). *Practical Handbook of Remote Sensing*. CRC Press.
8. Liang, S. (2004). *Quantitative Remote Sensing of Land Surfaces*. Wiley.
9. Mather, P. M., & Koch, M. (2011). *Computer Processing of Remotely Sensed Images: An Introduction*. Wiley-Blackwell.
10. Richards, J. A. (2013). *Remote Sensing Digital Image Analysis: An Introduction*. Springer.
11. Tso, B., & Mather, P. M. (2009). *Classification Methods for Remotely Sensed Data*. CRC Press.
12. Chauniyal, D. D. (2004). *Remote Sensing and Geographic Information Systems* (in Hindi). Sharda Pustak Bhawan.
13. Nag, Prithvish, & Kudrat, M. (1998). *Digital Remote Sensing*. Concept Publishing Company.
14. Reddy, M. A. (2001). *Textbook of Remote Sensing and Geographic Information Systems*. B. S. Publications.
15. Siddiqui, M. A. (2005). *Introduction to Geographical Information Systems*. Sharda Pustak Bhawan.

ADVANCED STATISTICS FOR SPATIAL ANALYSIS

Course Title: Advanced Statistics for Spatial Analysis	L	T	P	Cr
Course Code:	2	-	2	4

Type of Course: Major Course

Total Hour: 60 Hours

Course Learning Objectives (CLO): By studying this course, students would be able to:

CLO 1: learn various techniques of spatial pattern and network analysis.
CLO 2: familiar with recent software of statistics.
CLO 3: analysis and estimate the trend of data.
CLO 3: develop skills in Spatial big data and Machine Learning.
CLO 4: develop analytical skills through learning hypothesis.

Course Learning Outcomes (CLO): At the completion of the course, the students will be able to:
CLO1: develop skills in spatial pattern analysis.
CLO2: gain data analytics skill using recent software of statistics.
CLO3: familiar with Spatial big data and Machine Learning.
CLO4: develop scientific analysis through hypothesis building.

Unit/Hours	Content
Unit I / 15	Pattern and network analysis- Nearest Neighbour Analysis; Gini's Co-efficient; Lorenz curves; Location quotient; Network as a Graph; Alfa, Beta and Gamma Index of Connectivity; Accessibility by Detour Index
Unit II / 15	Probability and regression analysis - Introduction to statistical software: SPSS, STRATA, R, Python; Concept of probability; Linear Regression analysis; Absolute Residual; Relative Residuals; Mean absolute error; Standard error of estimate; multi-linear regression
Unit III / 15	Spatial big data and Machine Learning- Big Data and Spatial Big Data; Artificial Intelligence; Machine learning; Types of machine learning: Supervised, Unsupervised, Semi- supervised, Reinforcement; Introduction of machine learning algorithms; Concepts of some machine learning algorithms: Decision Tree, Random Forest, Support Vector Machine, Artificial Neural Network
Unit IV/ 15	Hypothesis testing - Concept of hypothesis; Parametric Hypothesis tests: t-test; Z-test and Analysis of Variance (ANOVA): Objectives, One-way and Two-way; Nonparametric Hypothesis tests: Chi-Square

Suggested/ Recommended readings:

1. Alpaydin, E. (2021). *Machine Learning*. MIT Press.
2. Alvi, Z. (2014). *Statistical Geography Methods and Applications*. Rawat Publications.
3. Clark, W. A. V., & Hosking, P. L. (1986). *Statistical Methods for Geographers*. Wiley and Sons.
4. Dorman, M. (2014). *Learning R for Geospatial Analysis*. Packt Publishing Ltd.
5. Gregory, S. (2014). *Statistical Methods and the Geographer*. Routledge.
6. Hammond, R., & McCullagh, P. (1991). *Quantitative Techniques in Geography*. Clarendon Press.

7. Kabacoff, R. I. (2015). *R in Action: Data Analysis and Graphics with R*. Simon and Schuster.
8. Kelleher, J. D., Mac Namee, B., & D'arcy, A. (2020). *Fundamentals of Machine Learning for Predictive Data Analytics: Algorithms, Worked Examples, and Case Studies*. MIT Press.
9. Kubat, M., & Kubat. (2017). *An Introduction to Machine Learning*. Springer International Publishing.
10. Matthews, J. A. (2013). *Quantitative and Statistical Approaches to Geography: A Practical Manual*. Elsevier.
11. Rogerson, P. A. (2019). *Statistical Methods for Geography: A Student's Guide*. Sage.
12. Sarkar, A. (2000). *Practical Geography: A Systematic Approach*. Orient Blackswan.
13. Sarkar, A. (2013). *Quantitative Geography: Techniques and Presentations*. Orient Blackswan.
14. Cressie, N. A. C. (1991). *Statistics for Spatial Analysis*. Wiley.
15. Bhagwathi, V., & Pillai, R. S. N. (2003). *Practical Statistics*. Sultan Chand and Company.
16. Gupta, S. P. (1998). *Advanced Practical Statistics*. Sultan Chand and Company.
17. Mahmood, A. (1986). *Statistical Methods in Geographical Studies*. Rajesh Publications.
18. Zamir, A. (2002). *Statistical Geography: Methods and Applications*. Rawat Publications.

DEMOGRAPHIC TECHNIQUES

Course Title: Demographic Techniques	**L**	**T**	**P**	**Cr**
Course Code:	4	-	-	4
Type of Course: Major Course/Minor Course				
Total Hour: 60 Hours				
Course Learning Objectives: By studying this course, students would be able to: CLO1: understand basic measures in demography and elementary tools of demographic analysis. CLO2: examines various measures of fertility, mortality, nuptiality, urbanization and migration CLO3: understand concepts and construction of life table.				
Course Learning Outcomes (CLO): At the completion of the course, the student will be able to: CLO1: learn basic concepts of demography. CLO2: demonstrate the basic measures of Mortality and Life Table. CLO3: validate measures of Fertility and Nuptiality. CLO4: understand the basic concepts of Migration and Urbanisation.				

Unit/Hours	**Content**
Unit I/ 15 Hours	Introduction, Basic Concepts and Measures-Definition and Scope, Linkage with Public Health, History of formal Demography; Universe and Variables,

	Rates and Ratio, Basic Demographic Equation, Population Change, Demographic Dividends, Population Momentum
Unit II / 15 Hours	Mortality: Basic Measures and Life Table- Crude Death Rate (CDR), Age-Specific Death Rate (ASDR), Useful Measures of Mortality: Infant Mortality Rate (IMR), Neonatal mortality rate (NMR), Post-neonatal mortality (PNMR), maternal mortality ratio (MMR), maternal mortality rate (MMRT); Life Table: concept, columns and Construction.
Unit III/ 15 Hours	Fertility and Nuptiality-Crude birth rate (CBR), General fertility rate (GFR), Age-specific fertility rate (ASFR), Total fertility rate (TFR), Child–Woman ratio (CWR), Specific fertility rates, Gross reproduction rate (GRR), Net Reproduction Rate (NRR), Crude marriage rate, duration of marriage, age at marriage, Singulate Mean Age at Marriage (SMAM).
Unit IV/ 15 Hours	Migration and Urbanization- Migration: importance, concepts, Estimations, limitations, Accuracy of data. Urbanisation- Concepts and Definitions, Measurement, Slums

Suggested/ recommended readings:

1. Barclay, G. W. (1958). *Techniques of Population Analysis*. New York: John Wiley and Sons.
2. Bhende, A. and Kanitkar, T. (2000). *Principles of Population Studies*. Bombay: Himalaya Publishing House.
3. Coale, A. J., Demeny, P. and Vaughn, B. (1983). *Regional Model Life Tables and Stable Populations*. Princeton, NJ: Princeton University Press.
4. Preston, S. H., Patrick H. and Guillot, M. (2001). *Demography: Measuring and Modeling Population Processes*. Oxford: Blackwell Publishers.
5. Shryock H.S. and Siegel, J. S. (1971). *The Methods and Materials of Demography*. Vols. I and II. Washington D.C.: US Bureau of Census.
6. Srinivasan, K. (1998). *Basic Demographic Techniques and Applications*. New Delhi: Sage Publications.

SEMESTER X

DISSERTATION/PROJECT WORK

Course Title: Dissertation	L	T	P	Cr
Course Code:	-	-	20	20

Type of Course: Dissertation

Total Hour: 60 Hours

Course Learning Objectives (CLO): The objective of the course is to:

CLO1: familiarize student about their potentials and utilization relevant to geographical research.

CLO2: based on specialization and assigned topic, the student has to undertake study in a particular area.

CLO3: learn the skills associated with undertaking focused research, meeting the set objectives, undertaking data analysis, and preparing a scientific report.

Course Learning Outcomes (CLO): At the completion of the course, the student will be able to:

CLO1: prepare Dissertation Report.

CLO2: inculcate the ability to undertake scientific research and report writing.

CLO3: develop the student with an understanding and appreciation of the mutual dependence of different techniques and their relevance.

CLO4: apply the knowledge and technique learnt in report writing and data analysis.

Unit/Hours	Content
	Dissertation The student will work on the dissertation in the relevant field of Geography and compile his/her thesis in consultation with the concern Supervisor/Guide. Dissertation must be written in the logical framework under the following headings: 1. Statement of the Problem 2. Conceptual Background 3. Objectives of Study 4. Hypothesis/Research Questions 5. Literature Review 6. Location of the Study Area 7. Methodology including data / information / map collection) 8. Data Sources (Based on Primary, Secondary and Laboratory work) 9. Findings/ Observations/ Interpretation of Data (relating to each Objective separately) 10. Results and Discussion 11. Conclusion 12. References

The Dissertation work must contain Acknowledgement, Preface, Table of Content, List of Tables, List of Figures, List of Photographs, List of References, Appendix, and Bibliography/ Reference.

Presentation

Each student shall present his / her Project before an audience comprising Internal / External Examiners and others on the day of Examination using PPT (maximum 25 slides about – concept / idea / theme; major objectives; methodology; study area; observations and analysis; conclusion).

Note: The work should be original one and the department will check plagiarism.

After completion of Sem-IX and X with 40 credits, students will be awarded PG Degree (One Year) in Geography.

Suggested/ Recommended readings:

1. Clifford, N., Cope, M., Gillespie, T., & French, S. (Eds.). (2016). *Key methods in geography*. Sage.
2. Gomez, B., & Jones III, J. P. (Eds.). (2010). *Research methods in geography: A critical introduction*. Vol. 6. John Wiley & Sons.
3. Hegde, D. S. (Ed.). (2015). *Essays on research methodology*. Springer.
4. Kimberley Peters (2017). *Your human geography dissertation: designing, doing*. Sage Publication Ltd.
5. Kleiner, S. (1993). *The logic of discovery: a theory of the rationality of scientific research*. Springer Science & Business Media.
6. Knight, Peter G. & Parsons, Tony (2015). *How to do your dissertation in geography and related disciplines*. Routledge, London.
7. Kothari, C.R. (1993). Research methodology: methods and techniques. Wiley Eastern Ltd. New Delhi.
8. Kumar, Ranjit (2019). *Research methodology: a step-by-step guide for beginners*. Sage Publications Limited. London.
9. Locharoenrat, K. (2017). *Research methodologies for beginners*. Pan Stanford.
10. Mellenbergh, G. J., & Adèr, H. J. (Eds.) (1999). *Research methodology in the life, behavioural and social sciences*. Sage.
11. Pruzan, P. (2016). *Research methodology: the aims, practices and ethics of science*. Springer.
12. Singh, Y. K. (2006). *Fundamental of research methodology and statistics*. New Age International.
13. Yeong, F. M. (2014). *How to read and critique a scientific research article: notes to guide students reading primary literature* (with Teaching Tips for Faculty Members). World Scientific Publishing Company.

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