SIDDHARTH UNIVERSITY

Kapilvastu, Siddharth Nagar, Uttar Pradesh (IND)

Syllabi

As per

National Education Policy (NEP)-2020

Subject

GEOGRAPHY

Four Year Undergraduate Programme (FYUGP)

[B.A. 3 Year (Degree), B.A. 4 Year (Hons.) & B.A. 4 Year (Hons. With Research)]

P.G. Programme & Research

[M.A. 2 Year (Degree) & M.A. 1 Year (Integrated), and Research]

Prepared/Updated by:

Board of Studies (BoS) of the Department of Geography

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Preface

Geography is one of the most comprehensive and integrative disciplines of knowledge, bridging the physical and social sciences, blending field-based traditions with modern technological innovations. This syllabus for the Four-Year BA and Integrated PG in Geography has been designed to offer students both a solid academic foundation and practical competencies. It justifies itself not only as a discipline rooted in centuries of geographical thought and field practices, but also as a forward-looking programme aligned with the needs of society, research, and industry. The structure of descriptive assessment in odd semesters and objective, MCQ-based assessment in even semesters ensures balance between analytical expression and precise understanding, while practical and fieldwork components provide experiential learning. Together with clearly defined Programme Outcomes and Programme Specific Outcomes, the syllabus reflects the vision of creating geography graduates capable of engaging with the world critically, scientifically, and ethically.

Introduction

The BA Geography programme is structured to nurture curiosity about the Earth's physical processes, human–environment interactions, and spatial variations at local, regional, and global scales. Its design combines strong conceptual learning with skill-based training, allowing students to progress from fundamentals to advanced applications. The pedagogy emphasises lectures, discussions, field studies, and ICT-enabled learning, while assessment integrates descriptive, objective, and practical modes. This approach develops not only knowledge but also the ability to apply it in multiple contexts, a quality captured in the Programme Outcomes and Programme Specific Outcomes. The outcomes focus on ensuring that graduates understand geographical concepts and processes, conduct fieldwork, apply geospatial tools, communicate effectively, uphold ethics, and contribute to sustainable development. Specific orientation towards cartography, remote sensing, GIS, statistical analysis, and regional evaluation ensures that students graduate with competencies suited for both academic and professional growth. The programme is thus holistic in scope and dynamic in application.

Vision and Mission

The vision of the programme is to create a generation of geographers who can integrate traditional wisdom with modern technological skills, contributing to society through critical understanding, applied research, and sustainable solutions. Its mission is to impart rigorous academic knowledge, hands-on training in geospatial technologies, and a strong sense of responsibility towards environment, society, and development planning. The department aims to prepare students for higher academic pursuits, professional opportunities, and meaningful engagement with regional and global challenges.

From Traditional Knowledge to Modern Applications

A unique strength of this programme is its recognition of the continuity between traditional geographical knowledge and contemporary technological applications. The foundations of the discipline are introduced through the paper on Geographical Thought, which highlights the contributions of ancient Indian, classical, and Western traditions of geographical inquiry. This ensures that students develop an appreciation for indigenous practices, cultural landscapes, and regional traditions that have shaped human understanding of space and environment. Building on these foundations, the programme progressively incorporates modern cartography, statistics, computer-based mapping, remote sensing, and GIS, allowing students to apply timeless geographical questions through modern scientific tools. In this way, the syllabus bridges heritage with innovation, ensuring that graduates are rooted in intellectual traditions yet capable of addressing contemporary challenges through cutting-edge practices.

Academic and Industry Orientation

The importance of this programme lies equally in its academic orientation and industry relevance. Academically, it provides the conceptual, methodological, and ethical grounding necessary for higher studies, research, and teaching in geography and allied disciplines. The combination of descriptive, analytical, and practical learning ensures readiness for postgraduate studies, competitive examinations, and scholarly inquiry. On the industry side, the programme equips students with essential skills in GIS, remote sensing, digital cartography, survey methods, and spatial data analysis, making them suitable for employment in geospatial industries, environmental consultancy, regional and urban planning, disaster management, resource assessment, and governmental as well as non-governmental organisations. By balancing tradition with modernity, and academic knowledge with industry-oriented skills, the BA Geography programme emerges as both a cultural legacy and a professional gateway.

Significance of the Programme

The significance of this programme lies in its ability to blend knowledge, skills, and values into a coherent academic journey. It does not treat geography merely as an academic subject but as a way of thinking and problem-solving that is urgently needed in today's world. Students passing through this programme will not only understand the processes that shape the Earth and human societies but also develop the competence to map, Analyse, and communicate these processes using advanced tools. By balancing descriptive and objective evaluation, theory and practice, classroom learning and fieldwork, as well as traditional thought and ICT-based applications, the curriculum creates well-rounded graduates who can contribute to both scholarship and society. Its industry orientation ensures that learners are employable and capable of working with geospatial technologies, while its academic depth prepares them for research and higher education. Ultimately, the programme stands out as a bridge between the past and the future, between knowledge and application, and between academic pursuit and societal responsibility.

Outline of the Syllabus

Year	Sem.	Course Code	Paper Title	Theory/ Practical	Credits	Total Marks
1	I	**Year – 1, Semester – I**				
		BGEC101	Introduction to Physical Geography	Paper I (Theory)	4	75
		BGEP101	Practical	Paper II (Practical)	2	25
		BGEC102	Introduction to Geography	Paper II (Theory) MINOR	6	100
	II	**Year – 1, Semester – II**				
		BGEC111	Introduction to Human Geography	Paper I (Theory)	4	75
		BGEP111	Practical	Paper II (Practical)	2	25
		Total Credits (including other courses): 40; Level – 4.5; **Exit with Certificate**				
2	III	**Year – 2, Semester – III**				
		BGEC201	Introductory Geography of India	Paper I (Theory)	4	75
		BGEP201	Practical	Paper II (Practical)	2	25
		BGEC202	Introduction to Geography of India	Paper II (Theory) MINOR	6	100
	IV	**Year – 2, Semester – IV**				
		BGEC211	Economic Geography	Paper I (Theory)	4	75
		BGEP211	Practical	Paper II (Practical)	2	25
		BGEP212	Field Work/Project	Dissertation	3	100
		Total Credits (including other courses): 80; Level – 5; **Exit with Diploma**				
3	V	**Year – 3, Semester – V**				
		BGEC301	Evolution of Geographical Thoughts	Paper I (Theory)	4	75
		BGEC302	Cartography, Remote Sensing and GIS	Paper II (Theory)	4	75
		BGEP301	Practical	Paper II (Practical)	2	50
	VI	**Year – 3, Semester – VI**				
		BGEC311	Environmental Geography	Paper I (Theory)	4	75
		BGEC312	Regional Geography and Regional Planning	Paper II (Theory)	4	75
		BGEP311	Field Trip with Report	Paper II (Practical)	2	50
		Total Credits (including other courses): 120; Level – 5.5; **Exit with Degree**				

B.A. (Hons.)						
4	VII	**Year – 4; Semester – VII**				
		BGEC401	Advanced Geomorphology	Core Paper I (Theory)	4	100
		BGEC402	Advanced Climatology	Core Paper II (Theory)	4	100
		BGEC403	Advanced Oceanography	Core Paper III (Theory)	4	100
		BGEC404	Research Methodology	Core Paper IV (Theory)	4	100
		BGEP401	Practical	Practical	4	100
	VIII	**Year – 4; Semester – VIII**				
		BGEC411	Modern Geographical Thought	Core Paper I (Theory)	4	100
		BGEC412	Physical Geography of India	Core Paper II (Theory)	4	100
		BGEC413	Socio-Economic Geography of India	Core Paper III (Theory)	4	100
		BGEC414	Regional Planning	Core Paper IV (Theory)	4	100
		BGEP411	Practical	Practical	4	100
		Level – 6; **Exit with Hons. Degree**				

B.A. (Hons. with Research) / M.A. – 1st Year						
4	VII	**Year – 4; Semester – VII**				
		MGEC401	Advanced Geomorphology	Core Paper I (Theory)	4	100
		MGEC402	Advanced Climatology & Oceanography	Core Paper II (Theory)	4	100
		MGEC403	Research Methodology	Core Paper III (Theory)	4	100
		MGEP401	Practical	Practical	4	100
		MGEP402	Dissertation	Dissertation	4	100
	VIII	**Year – 4; Semester – VIII**				
		MGEC411	Modern Geographical Thought	Core Paper I (Theory)	4	100
		MGEC412	Physical Geography of India	Core Paper II (Theory)	4	100
		MGEC413	Socio-economic Geography of India	Core Paper III (Theory)	4	100
		MGEP411	Practical	Practical	4	100
		MGEP412	Dissertation	Dissertation	4	100
		Level – 6; **Exit with Hons. With Research Degree**				

M.A. – 1 Year (Integrated PG) /M.A. – 2nd Year						
5	IX	**Year – 5; Semester – IX**				
		MGEC501	Population Geography	Core Paper I (Theory)	4	100
		MGEE501-A	Resources Geography	Elect. Paper II (Theory)	4	100
		MGEE501-B	Agricultural Geography	Elect. Paper II-A (Theory)		
		MGEE501-C	Remote Sensing	Elect. Paper II-B (Theory)		
		MGEE502-A	Regional Planning	Elect. Paper III-A (Theory)	4	100
		MGEE502-B	Political Geography	Elect. Paper III-B (Theory)		
		MGEE502-C	Geographical Information System	Elect. Paper III-C (Theory)		
		MGEP501	Practical	Practical	4	100
		MGEP502	Dissertation	Dissertation	4	100
	X	**Year – 5; Semester – X**				
		MGEC511	Statistical Methods in Geography	Core Paper I (Theory)	4	100
		MGEE511-A	Geography of Rural Development	Elect. Paper II (Theory)	4	100
		MGEE511-B	Industrial Geography	Elect. Paper II-A (Theory)		
		MGEE511-C	Marketing Geography	Elect. Paper II-B (Theory)		
		MGEE512-A	Urban Geography	Elect. Paper III-A (Theory)	4	100
		MGEE512-B	Transport Geography	Elect. Paper III-B (Theory)		
		MGEE512-C	Geography of Health	Elect. Paper III-C (Theory)		
		MGEP511	Practical	Practical	4	100
		MGEP512	Dissertation	Dissertation	4	100
		Level – 6.5; **Exit with PG Degree**				
6	XI	**Research** **Year – 6; Semester – XI (Pre-Ph.D. Course Work)**				
		DGEC601	Introduction to Geographical Research	Theory	2	100
		DGEC602	Geovisualization in Geographical Research	Theory	2	100
		DGEP601	Research Methodology	Research Methodology	2	100
		DGEP602	Dissertation	Dissertation	2	100
		Level – 7; P.G. Diploma in Research				
6,7,8		**Level – 8; Research (Ph.D.) Degree**				

Program Outcomes

for Four Year Undergraduate Programme (FYUPG)

PO Code	Program Outcome
PO1	Understand physical and human geographical concepts and processes.
PO2	Conduct fieldwork and collect, interpret, and Analyse geographical data.
PO3	Apply geospatial tools like GIS, remote sensing, and cartography.
PO4	Interpret patterns and processes through maps, models, and statistical tools.
PO5	Demonstrate understanding of regional, national, and global environmental issues.
PO6	Use geographical thinking in planning and policymaking.
PO7	Communicate geographical ideas clearly through oral, written, and visual media.
PO8	Demonstrate research ethics, scientific integrity, and social responsibility.
PO9	Engage in interdisciplinary and lifelong learning.
PO10	Apply geography for sustainable development and problem solving.

Programme Specific Outcomes

PSO Code	Program Specific Outcome
PSO1	Apply cartographic, geospatial, and statistical tools for spatial analysis.
PSO2	Conduct independent geographic research, including field surveys and dissertations.
PSO3	Understand and evaluate regional and national development through geographical frameworks.

Pedagogy & Assessment Plan (BA Geography, Sem I–VI)

List of Pedagogical Approaches

(applicable throughout the programme as per requirement of the specific course)

1. **Lecture & Interactive Teaching**
   - Structured lectures with PPTs, maps, and visuals.
   - Use of storytelling for geographical concepts (e.g., explaining monsoon with lived examples).
   - Class discussions and Q&A sessions.
2. **Practical & Hands-on Learning**
   - Regular map work, GIS software demonstrations, field mapping, survey exercises.
   - Lab-based sessions for cartography, remote sensing, and statistical techniques.
3. **ICT-Enabled Learning**
   - Use of Google Earth, QGIS, ArcGIS demos.
   - Short videos/animations for explaining processes (volcanoes, cyclones, climate models).
   - Online datasets (Census, Landsat, Planet Scope).
4. **Field-based Pedagogy**
   - Short field visits (nearby rivers, settlements, land use) in early semesters.
   - Longer study tours and field reports in later semesters (Sem IV–VI).
5. **Collaborative Learning**
   - Group projects, presentations, poster making.
   - Peer-review of assignments.
6. **Skill-Oriented Tasks**
   - Data analysis, report writing, map interpretation.
   - Soft skills: presentation, academic writing, teamwork.

General Assessment Rules*

- **Theory Papers (75 marks each)**
  - **Continuous Assessment (25)** = 10 (assignment/group project) + 5 (attendance & performance) + 10 (internal tests; maybe MCQ, Google Form based).
  - **End-Semester Exam (50)**
    - Odd semesters → Descriptive
    - Even semesters → MCQ-based
    - Exceptions: *Minor papers in Sem I & III are MCQ-based even though they fall in odd semesters.*
- **Practical (Sem I–IV, 25 marks each)**
  - Exam under external examiner = 10
  - Viva voce = 5
  - Portfolio/notebook = 5
  - Survey exercise = 5
- **Practical (Sem V, 50 marks total)**
  - Just double the 25-mark scheme → Exam (20) + Viva (10) + Portfolio (10) + Survey exercise (10).
- **Practical (Sem VI, 50 marks total)** = Field Trip / Tour / Survey Report
  - Report = 25
  - Presentation = 10
  - Viva voce = 15

**Assessment/Evaluation scheme and mode will be as per the guidelines notified by the Siddharth University, Kapilvastu, Siddharth Nagar and may differ from the above mentioned tentative proposal for assessment/evaluation.*

Semester	Theory Papers	Pedagogy (Theory)	Assessment (Theory)	Practicals	Pedagogy (Practicals)	Assessment (Practicals)
Sem I *(Minor, MCQ-based)*	Introduction to Physical Geography (75)	Lectures with globe, atlas, models; PPTs; diagrams & animations; **Game-based learning** (quiz games, interactive MCQs); classroom discussions	**CA (25):** Assignment/project (10) + Attendance (5) + Internal MCQ tests (10) **End Sem (50):** MCQ	Cartography – Basic Map Work (25)	Lab-based map drawing, topographic sheets, scales; **Kinesthetic learning** (hands-on map work)	Exam (10) + Viva (5) + Portfolio (5) + Survey (5)
Sem II *(Even, MCQ-based)*	Climatology & Human Geography (75)	ICT-based teaching (climate animations), case studies, **Game-based learning** (simulation of weather/population growth), debates	CA (25): Assignment (10) + Attendance (5) + Internal MCQ tests (10) End Sem (50): MCQ	Climatic & Socio-economic Data (25)	Graphs, diagrams, cartograms, census/weather data; **Kinesthetic learning** (constructing graphs by hand)	Exam (10) + Viva (5) + Portfolio (5) + Survey (5)
Sem III *(Minor, MCQ-based)*	Economic Geography & Regional Studies (75)	Case studies (industries, agriculture), census data, chalk–talk + PPTs, **Game-based learning** (trade & resource allocation exercises)	CA (25): Assignment/data project (10) + Attendance (5) + Internal MCQ tests (10) End Sem (50): MCQ	Statistical Techniques (25)	Mean, median, correlation, regression using real data; **Kinesthetic learning** (manual calculations, plotting graphs)	Exam (10) + Viva (5) + Portfolio (5) + Survey (5)
Sem IV *(Even, MCQ-based)*	Cartography & Surveying (75)	Lectures, field demos, instruments, projections, intro to QGIS, **Expeditionar**	CA (25): Map/assignment (10) + Attendance (5) + Internal MCQ tests	Surveying & Thematic Mapping (25)	Chain, compass, plane table, thematic mapping; **Kinesthetic learning**	Exam (10) + Viva (5) + Portfolio (5) +

		y learning (short field exercises)	(10) End Sem (50): MCQ		(instrument handling) + **Expeditionary learning** (on-site surveys)	Survey (5)
Sem V *(Odd, Descriptive)*	(i) GIS & Remote Sensing (75) (ii) Environmental Geography (75)	GIS labs, satellite image interpretation, seminars, **Game-based learning** (GIS quizzes, eco-simulation games)	For each Paper: CA (25) + End Sem (50 Descriptive)	GIS & RS Applications (50)	Hands-on GIS (QGIS/Arc GIS), image interpretation; **Kinesthetic learning** (lab-based tasks); **Expeditionary learning** (field data integration)	Exam (20) + Viva (10) + Portfolio (10) + Survey (10)
Sem VI *(Even, MCQ-based)*	(i) Applied Geography (75) (ii) Research Methodology/Contemporary Issues (75)	Guided research, applied studies, poster presentations, **Game-based learning** (MCQ quizzes, role-play on policy issues), **Expeditionary learning** (field immersion)	For each Paper: CA (25) + End Sem (50 MCQ)	Field Trip / Survey Report (50)	Independent fieldwork, data collection, report writing, **Expeditionary learning** (tour/field trip as core pedagogy)	Report (25) + Presentation (10) + Viva (15)

Year – 1; Semester – I

Semester – I: Paper – I

Introduction to Physical Geography

Year	Semester	Course Code	Course Type	Course Title	Credit
1	Semester- I	BGEC101	Core Paper	**Introduction to Physical Geography**	4

Course Objectives (COs)

CO Code	Course Outcome
CO1	Explain the origin and structure of the Earth using various scientific theories.
CO2	Describe the internal structure of the Earth and its implications for geological time, isostasy, and plate tectonics.
CO3	Classify major geomorphic agents and processes, and interpret resulting landforms (fluvial, arid, coastal).
CO4	Explain key atmospheric elements such as temperature, pressure, wind systems, and precipitation.
CO5	Analyse the structure and characteristics of the ocean floor and oceanic processes like currents and tides.
CO6	Describe the biosphere, ecological succession, and the global distribution of major biomes with special reference to the Equatorial Biome.

Unit	Topics	No. of Lectures	Credit
Unit – I	Earth as a Planet in Solar System; Theories of Origin of The Earth – by Laplace, James Jeans, and Big-Bang Theory; Internal Structure of the Earth; Geological Time Scale; Isostasy; Continental Drift and Introduction to Plate Tectonics Theory; Rock Types	15	1
Unit – II	Classification of Enodgenetic and Exogenetic Forces Affecting Surface of The Earth, Earthquakes and Volcanos; Concept of Weathering and Erosion; Fluvial, Arid and Coastal Landforms; Cycle of Erosion by W.M. Davis	15	1
Unit – III	Composition and Structure of Atmosphere; Insolation and Heat Budget; Air Temperature; Atmospheric Pressure and Winds; Atmospheric Humidity and Types of Precipitation; Basic Concept of Cyclones and Anti-cyclones	15	1
Unit – IV	Relief Features of Ocean Bottoms (Indian Ocean Only); Temperature and Salinity Distribution in Oceans; Waves, and Tides; Ocean Currents (Atlantic Ocean Only); Biosphere,	15	1

	Biotic Successions, and Classification of Biomes of The Earth and Description of Equatorial Biome		

Course Learning Outcomes (CLOs)

After successful completion of this course, students will be able to:

CLO Code	Course Learning Outcome	Bloom's Level
CLO1	Describe Earth's position in the solar system and recall major theories of Earth's origin; explain its internal structure and geological time scale.	Remember, Understand
CLO2	Explain the concepts of isostasy, continental drift, and plate tectonic theory with examples.	Understand, Apply
CLO3	Classify rock types and differentiate between endogenetic and exogenetic processes (earthquakes, volcanoes, weathering, erosion).	Understand, Analyse
CLO4	Illustrate and interpret landforms created by fluvial, arid, and coastal processes, and evaluate Davis' cycle of erosion.	Apply, Analyse, Evaluate
CLO5	Explain atmospheric composition, structure, and weather elements (temperature, pressure, winds, humidity, precipitation), and Analyse cyclonic systems.	Understand, Analyse
CLO6	Discuss oceanographic features including ocean bottom relief, salinity, temperature, currents, tides, and waves.	Understand, Analyse
CLO7	Summarize biosphere components, ecological succession, and classify major world biomes with emphasis on the equatorial biome.	Understand, Apply

A. Suggested Textbooks

Classical Foundations

1. Lake, P. (2002). *Physical geography* (8th ed.). Surjeet Publications. *(Original work published 1901)*
2. Strahler, A. N., & Strahler, A. H. (2006). *Introducing physical geography* (4th ed.). Wiley India.
3. Trewartha, G. T. (1968). *Elements of physical geography* (4th ed.). McGraw-Hill.
4. Petersen, J. F., Sack, D., & Gabler, R. E. (2016). *Physical geography* (11th ed.). Cengage Learning.

Indian Authors

5. Singh, S. (2014). *Bhautiki Bhugol (भौतिक भूगोल)*. Pravalika Publications. *(Hindi)*
6. Singh, S. (2019). *Physical geography*. Prayag Pustak Bhawan. *(English edition)*
7. Dey, N. (2005). *Physical geography*. Chhaya Prakashani. *(Bilingual resource)*
8. Sharma, J. P. (2003). *Prakritik Bhugol (प्राकृतिक भूगोल)*. Rastogi Publications. *(Hindi)*

Modern International Textbooks

9. Christopherson, R. W., & Birkeland, G. H. (2023). *Geosystems: An introduction to physical geography* (11th ed.). Pearson.
10. Tarbuck, E. J., Lutgens, F. K., & Tasa, D. G. (2019). *Earth: An introduction to physical geology* (13th ed.). Pearson.
11. Hess, D., & Tasa, D. G. (2022). *McKnight's physical geography: A landscape appreciation* (13th ed.). Pearson.

B. Further Reading and Online Resources

Reference Books

12. Summerfield, M. A. (2014). *Global geomorphology* (2nd ed.). Routledge.
13. Lutgens, F. K., Tarbuck, E. J., & Tasa, D. G. (2022). *The atmosphere: An introduction to meteorology* (14th ed.). Pearson.
14. Skinner, B. J., Murck, B. W., & Porter, S. C. (2010). *The blue planet: An introduction to Earth system science* (3rd ed.). Wiley-Blackwell.
15. Pinet, P. R. (2021). *Invitation to oceanography* (8th ed.). Jones & Bartlett Learning.

Online Resources

16. NASA Earth Observatory – https://earthobservatory.nasa.gov
17. USGS Earthquake Hazards Program – https://earthquake.usgs.gov
18. NOAA Jetstream: Online Weather School – https://www.weather.gov/jetstream
19. IPCC Interactive Atlas – https://interactive-atlas.ipcc.ch
20. British Geological Survey – https://www.bgs.ac.uk/discovering-geology

Semester – I: Paper – II

Practical

Year	Semester	Course Code	Course Type	Course Title	Credit
1	Semester- II	BECC102	Core Paper	**Practical**	2

Course Objectives (COs)

CO Code	Course Outcome
CO1	Interpret geographical phenomena using various types of maps and geovisual tools.
CO2	Apply principles of map design and represent physical features and landforms on topographic sheets.
CO3	Analyse weather maps and real-time weather data from IMD and Zoom Earth platforms.
CO4	Perform morphometric analysis using contours, drainage features, and digital elevation models (DEM).
CO5	Delineate watersheds and extract stream networks using DEM-based GIS tools.
CO6	Conduct basic land surveying using plane table and clinometer techniques.

Unit	Topics	No. of Lectures	Credit
Unit – I	Geographical Phenomena and Their Representation (Maps and Geovisualization); Maps – Classification, and Types; Fundamental Principles of Map Design; Interpretation of Physical Features on Toposheets; Identification of Landforms on Toposheets; Construction of Serial, Superimposed, Composite and Projected Profiles; Weather Maps; Interpretation of Daily/Current Weather Updates at IMD Website and Zoom Earth App	30	1
Unit – II	Conventional Morphometry using Contours and Drainage on Toposheets; Digital Elevation Model (DEM) – Calculation of Slope, Aspect and Creation of Hillshade; Watershed Mapping using DEM – Basin Delineation, Calculating Flow, and Stream Extraction **Surveying: Plane Table Survey – Mapping with Radial and Intersection Methods; Indian Clinometer Survey**	30	1

Course Learning Outcomes (CLOs)

CLO Code	Course Learning Outcome	Bloom's Level
CLO1	Demonstrate classification and types of maps and apply fundamental principles of map design.	Understand, Apply
CLO2	Interpret physical and cultural features on Survey of India toposheets and identify major landforms.	Analyse, Apply
CLO3	Construct serial, superimposed, composite, and projected profiles using contour data.	Apply

CLO4	Analyse and interpret weather maps and daily meteorological updates from IMD and online platforms such as Zoom Earth.	Analyse, Evaluate
CLO5	Perform conventional morphometric analysis using contours and drainage networks; calculate slope, aspect, and generate hillshade using DEM.	Apply, Analyse
CLO6	Delineate watersheds and extract stream networks using DEM in GIS environment.	Apply, Analyse
CLO7	Conduct basic plane table surveying using radial and intersection methods and use clinometer for slope measurement.	Apply, Understand

Suggested Readings

A. Textbooks (Core Practical Geography Readings)

1. Singh, R. L., & Singh, R. P. B. (2005). *Elements of practical geography* (9th ed.). Kalyani Publishers.
2. Ghosh, A. (1999). *Practical geography* (3rd ed.). Orient Longman.
3. Monkhouse, F. J., & Wilkinson, H. R. (1973). *Maps and diagrams* (3rd ed.). Methuen & Co.
4. Robinson, A. H., Morrison, J. L., Muehrcke, P. C., Kimerling, A. J., & Guptill, S. C. (1995). *Elements of cartography* (6th ed.). Wiley.
5. Sharma, J. P. (2013). *Prayogik Bhugol ke Tatva (प्रायोगिक भूगोल के तत्व)*. Rastogi Publications. *(Hindi)*
6. Singh, L. R. (2014). *Prayogik Bhugol (प्रायोगिक भूगोल)*. Central Book Depot. *(Hindi)*
7. Mishra, R. P., & Ramesh, A. (2002). *Fundamentals of cartography* (2nd ed.). Concept Publishing.

B. Further Readings and Advanced Resources

Surveying & Digital Techniques

8. Kanetkar, T. P., & Kulkarni, S. V. (2004). *Surveying and levelling (Vol. 1 & 2)*. Pune Vidyarthi Griha Prakashan.
9. Burrough, P. A., & McDonnell, R. A. (1998). *Principles of geographical information systems* (2nd ed.). Oxford University Press.
10. Lo, C. P., & Yeung, A. K. W. (2006). *Concepts and techniques of geographic information systems* (2nd ed.). Pearson Prentice Hall.

C. Online and Open Resources

11. **IMD (India Meteorological Department)**
- Weather Maps, Synoptic Charts, and Satellite Images
- https://mausam.imd.gov.in
- https://imd.gov.in

12. **Zoom Earth**
- Near real-time weather visualization
- https://zoom.earth

13. **ISRO Bhuvan/Bhoonidhi Portal (for DEMs and watershed mapping)**
- https://bhuvan.nrsc.gov.in

14. **USGS Earth Explorer**
- Source for DEM and remote sensing datasets
- https://earthexplorer.usgs.gov

15. **QGIS Official Documentation (for open-source GIS practice)**
- https://docs.qgis.org

Semester – I: Paper – III (**Minor Course**)

Introduction to Geography

Year	Semester	Course Code	Course Type	Course Title	Credit
1	Semester- I	BECC102	Core Paper	**Introduction to Geography**	6

Course Outcomes (COs)

CO Code	Course Outcome
CO1	Explain the nature, scope, and branches of geography, along with major paradigms of man–environment relationships.
CO2	Describe the origin, internal structure, and dynamic processes of the Earth, including plate tectonics and rock types.
CO3	Analyse geomorphic processes and landforms created by endogenetic and exogenetic forces.
CO4	Explain atmospheric structure and processes, including temperature, pressure, winds, precipitation, and cyclonic systems.
CO5	Describe ocean bottom relief, temperature, salinity, waves, tides, and currents, with reference to the Indian and Atlantic Oceans.
CO6	Interpret the biosphere, ecological succession, biomes of the world, with emphasis on the Equatorial Biome.
CO7	Analyse spatial patterns of population distribution, settlement forms, urbanization, and cultural regions.

Unit	Topics	No. of Lectures	Credit
Unit – I	Geography – Definitions, Nature, Meaning and Scope; Branches of Geography; Man-Environment Relationships: Determinism, Possibilism, and Neo-determinism in Geography	15	1
Unit – II	Theories of Origin of The Earth – by Laplace, James Jeans, and Big-Bang Theory; Internal Structure of the Earth; Continental Drift and Introduction to Plate Tectonics Theory; Rock Types	15	1
Unit – III	Classification of Endogenetic and Exogenetic Forces Affecting Surface of The Earth, Earthquakes and Volcanos; Concept of Weathering and Erosion; Fluvial, Arid and Coastal Landforms	15	1
Unit – IV	Composition and Structure of Atmosphere; Insolation and Heat Budget; Air Temperature; Atmospheric Pressure and Winds; Atmospheric Humidity and Types of Precipitation; Basic Concepts of Cyclones and Anti-cyclones	15	1

Unit – V	Relief Features of Ocean Bottoms (Indian Ocean Only); Temperature and Salinity Distribution in Oceans; Waves, and Tides; Ocean Currents (Atlantic Ocean Only); Biosphere, Biotic Successions, and Classification of Biomes of The Earth and Description of Equatorial Biome	15	1
Unit – VI	World Population Distribution; Types and Patterns of Rural Settlements; Classification of Towns; Urbanisation and Its Impact on Spatial Systems; Cultural Regions	15	1

Course Learning Outcomes (CLOs)

CLO Code	Course Learning Outcome	Bloom's Level
CLO1	Define geography, explain its nature, meaning and scope, and distinguish major branches.	Remember, Understand
CLO2	Examine man–environment relationships through determinism, possibilism, and neo-determinism.	Understand, Analyse
CLO3	Describe theories of Earth's origin, explain its internal structure, and interpret the concepts of continental drift and plate tectonics.	Understand, Analyse
CLO4	Classify endogenetic and exogenetic forces, and illustrate associated landforms, earthquakes, and volcanoes.	Understand, Apply
CLO5	Explain structure and composition of the atmosphere, elements of weather and climate, and basic processes of precipitation and cyclones.	Understand, Apply
CLO6	Discuss oceanic relief, temperature–salinity distribution, and circulation patterns including currents, waves, and tides.	Understand, Analyse
CLO7	Analyse world population distribution, rural and urban settlement patterns, processes of urbanisation, and identify major cultural regions.	Understand, Analyse, Evaluate

Suggested Readings

A. Textbooks (Core Readings)

1. Foundations and Physical Geography

1. Trewartha, G. T. (1968). Elements of physical geography (4th ed.). McGraw-Hill.
2. Petersen, J. F., Sack, D., & Gabler, R. E. (2016). Physical geography (11th ed.). Cengage Learning.
3. Christopherson, R. W., & Birkeland, G. H. (2023). Geosystems: An introduction to physical geography (11th ed.). Pearson.
4. Strahler, A. N., & Strahler, A. H. (2006). Introducing physical geography (4th ed.). Wiley India.
5. Singh, S. (2019). Physical geography. Prayag Pustak Bhawan. (English)
6. Singh, S. (2014). Bhautiki Bhugol (भौतिक भूगोल). Pravalika Publications. (Hindi)

2. Geographical Thought & Concepts

7. Dikshit, R. D. (1997). Geographical thought: A contextual history of ideas (2nd ed.). Prentice Hall of India.
8. Hartshorne, R. (1959). Perspective on the nature of geography. Rand McNally.

9. Singh, L. R. (2009). Fundamentals of human geography. Sharda Pustak Bhawan. (Indian perspective)
10. Husain, M. (2012). Evolution of geographical thought. Rawat Publications. (Hindi & English versions available)
3. Human Geography Topics
11. Knox, P., & Marston, S. (2016). Places and regions in global context: Human geography (7th ed.). Pearson.
12. Fellmann, J. D., Getis, A., & Getis, J. (2007). Human geography: Landscapes of human activities (10th ed.). McGraw-Hill.
13. Chandna, R. C. (2019). Population geography. Kalyani Publishers.
14. Siddhartha, K., & Mukherjee, S. (2013). Cities, urbanisation and urban systems. Kitab Mahal.
B. Further Reading and Online Resources
Reference Books
15. Summerfield, M. A. (2014). Global geomorphology (2nd ed.). Routledge.
16. Pinet, P. R. (2021). Invitation to oceanography (8th ed.). Jones & Bartlett Learning.
17. Ghosh, A. (2008). Introduction to settlement geography. Orient Black Swan.
18. Jackson, R. H., & Hudman, L. E. (2008). Cultural geography: People, places and environment (10th ed.). Pearson.
Authoritative Online Resources
19. UN Population Division – https://population.un.org
20. Census of India – https://censusindia.gov.in
21. India Meteorological Department (IMD) – https://mausam.imd.gov.in
22. NASA Earth Observatory – https://earthobservatory.nasa.gov
23. IPCC Data Portal – https://data.ipcc.ch
24. National Atlas & Thematic Mapping Organisation (NATMO), India – https://natmo.gov.in
25. Zoom Earth (for live weather and satellite imagery) – https://zoom.earth

Year – 1; Semester – II

Semester – II: Paper – I

Introduction to Human Geography

Year	Semester	Course Code	Course Type	Course Title	Credit
1	Semester- II	BECC201	Core Paper	**Introduction to Human Geography**	4

Course Outcomes (COs):

CO Code	Course Outcome
CO1	Define the nature, scope, and approaches of human geography and differentiate it from other branches.
CO2	Analyse the evolution of man–environment relationships through determinism, possibilism, and neo-determinism.
CO3	Evaluate population distribution, growth patterns, migration types, and demographic transition theory.
CO4	Identify types of rural settlements, town classifications, and interpret patterns of urbanization and smart cities.
CO5	Explain major racial classifications, language distribution, and cultural realms and regions of the world.

Unit	Topics	No. of Lectures	Credit
Unit- I	Geography – Definitions, Nature, Meaning and Scope; Approaches to The Study of Geography; Branches of Geography; Man-Environment Relationships: Determinism, Possibilism, and Neo-determinism in Geography	15	1
Unit- II	World Population Distribution; Population Growth and Demographic Transition Theory; Concept of Optimum Population; Migration and Its Types	15	1
Unit- III	Types and Patterns of Rural Settlements; Classification of Towns; Urbanisation and Its Impact on Spatial Systems; Concept of Smart Cities	15	1
Unit- IV	Races of Mankind and Classification of Human Races (Griffith Taylor's); Geography of Languages; Cultural Realms and Regions of the World	15	1
Course Learning Outcomes (CLOs)			

CLO Code	Course Learning Outcome	Bloom's Level
CLO1	Define the nature, meaning, scope and approaches of human geography, and distinguish it from other branches of geography.	Remember, Understand
CLO2	Analyse the evolution of man–environment relationships through determinism, possibilism, and neo-determinism.	Analyse, Evaluate
CLO3	Explain the distribution and growth of world population, demographic transition, concept of optimum population, and types of migration.	Understand, Analyse
CLO4	Identify and classify types of rural settlements, town categories, and evaluate the impact of urbanization and the concept of smart cities.	Understand, Analyse, Evaluate
CLO5	Discuss racial classifications, geography of languages, and cultural realms and regions of the world.	Understand, Apply
CLO6	Develop the ability to relate cultural and demographic processes to spatial organization and patterns at global scale.	Apply, Analyse

Suggested Readings:

A. Core Textbooks

1. Chandna, R. C. (2023). Population geography. Kalyani Publishers.
2. Ghosh, S. (1998). Settlement geography. Orient Longman.
3. Hussain, M. (2013). Human geography. Rawat Publications.
4. Majid, H. (2014). Manav Bhugol (मानव भूगोल). Rawat Publications.
5. Maurya, S. D. (2019). Manav Bhugol. Sharda Pustak Bhawan.
6. Maurya, S. D. (2022). Population geography. Sharda Pustak Bhawan.
7. Singh, L. R. (2011). Fundamentals of human geography. Sharda Pustak Bhawan.
8. Sharma, J. P. (2005). Manav Bhugol ke Mool Tatva (मानव भूगोल के मूल तत्व). Rastogi Publications.
9. Siddhartha, K., & Mukherjee, S. (2000). Cities, urbanisation and urban systems. Kisalaya Publications.

B. International Standard Textbooks

1. Fellmann, J. D., Getis, A., Getis, J., & Malinowski, J. (2019). *Human geography: Landscapes of human activities* (13th ed.). McGraw-Hill Education.
2. Knox, P. L., & Marston, S. A. (2015). *Human geography: Places and regions in global context* (7th ed.). Pearson.
3. De Blij, H. J., & Murphy, A. B. (2012). *Human geography: Culture, society, and space* (9th ed.). Wiley.
4. Daniels, P., Bradshaw, M., Shaw, D., & Sidaway, J. (2016). *An introduction to human geography: Issues for the 21st century* (5th ed.). Pearson Education.
5. Rubenstein, J. M. (2021). *The cultural landscape: An introduction to human geography* (13th ed.). Pearson.
6. Greiner, A. L. (2023). *Visualizing human geography: At home in a diverse world* (4th ed.). Wiley.

C. Reference Books / Enrichment Readings

1. Johnston, R. J., Gregory, D., Pratt, G., & Watts, M. (2000). *The dictionary of human geography* (4th ed.). Blackwell.
2. Hudson, F. S. (1970). *A geography of settlements*. Macdonald and Evans.
3. Taylor, G. (1945). *Environment and race*. Oxford University Press.
4. Zelinsky, W. (1973). *Cultural geography of the United States*. Prentice Hall.
5. Singh, J. (2009). *Urban geography*. Gyan Books.
6. Sopher, D. E. (1980). *An exploration of India: Geographical perspectives on society and culture*. Cornell University Press.

D. Online Resources & Government Portals

Resource	Website
Census of India	https://censusindia.gov.in
UN Population Division	https://population.un.org
Pew Research (Migration and Religion Maps)	https://pewresearch.org
Smart Cities Mission (India)	https://smartcities.gov.in
Ethnologue (Languages of the World)	https://www.ethnologue.com
World Bank Urban Development	https://www.worldbank.org/en/topic/urbandevelopment
Esri Story Maps: Human Geography	https://storymaps.arcgis.com
National Geographic Human Geography Portal	https://education.nationalgeographic.org

Semester – II: Paper – II

Practical

Year	Semester	Course Code	Course Type	Course Title	Credit
1	Semester- I	BECC102	Core Paper	**Practical**	2

Course Outcomes (COs)

CO Code	Course Outcome
CO1	Construct simple and comparative graphical scales and apply them in map interpretation.
CO2	Differentiate between spatial data types and attribute data classifications used in geography and GIS.
CO3	Interpret cultural and physical features on Survey of India (SOI) toposheets using standard map elements.
CO4	Use QGIS software to design maps with grids, legends, and other cartographic elements, and export the final output.
CO5	Apply surveying techniques including plane table resection and three-point problem-solving methods.

Unit	Topics	No. of Lectures	Credit
Unit – I	Map Scale – Graphical Construction of Simple, and Comparative Scales; Geographical Data; Spatial Data – Point, Line, Area and Volume; Continuous vs. Discrete; Attribute Data Types – Based on Scales of Measurement (Nominal, Ordinal, Interval, and Ratio), Based on Storage Type GIS Attribute Table (i.e. Text, Integer, Float, Date)	30	1
Unit – II	Introduction to Survey of India (SOI) Toposheets; Interpretation of Cultural Features on Toposheets; Basic Map Elements – Grids & Graticules, Legend, Scale-bar, and North Arrow etc.; Commercial and Open-source GIS Software; Overview of QGIS Interface; Map Composition in QGIS using Basic Map Elements and Exporting the Final Output; **Surveying: Plane Table Survey – Resection using Tracing Paper Method; Three-point Problem – Trial and Error Method and Geometrical Methods**	30	1

Course Learning Outcomes (CLOs)

CLO Code	Course Learning Outcome	Bloom's Level
CLO1	Construct simple and comparative map scales graphically and explain their uses.	Remember, Apply

CLO2	Differentiate between spatial and attribute data; classify data types based on measurement scales and storage in GIS environment.	Understand, Analyse
CLO3	Interpret cultural features and basic map elements (grids, graticules, legend, scale-bar, north arrow) on Survey of India toposheets.	Apply, Analyse
CLO4	Operate commercial and open-source GIS software, with emphasis on QGIS interface and map composition.	Apply
CLO5	Perform georeferencing, digitization, and tabular data entry in GIS for preparing thematic maps.	Apply, Analyse
CLO6	Conduct plane table surveying using resection methods, including tracing paper and three-point problem techniques.	Apply

Suggested Readings:

A. Core Textbooks (Indian & International)

1. **Tiwari, R. C.** (2022). *Prayogik Bhugol* (प्रायोगिक भूगोल) (Hindi). Prayag Pustak Bhawan.
2. **Maurya, S. D.** (2021). *Map Practice and Cartography*. Sharda Pustak Bhawan.
3. **Singh, L. R.** (2020). *Prayogik Bhugol* **(प्रायोगिक भूगोल)** *(Hindi).* Central Book Depot.
4. **Misra, R. P., & Ramesh, A.** (1986). *Fundamentals of Cartography* (2nd ed.). McGraw-Hill Education.
5. **Kraak, M.-J., & Ormeling, F. J.** (2020). *Cartography: Visualization of spatial data* (4th ed.). CRC Press.
6. **Robinson, A. H., Morrison, J. L., Muehrcke, P. C., Kimerling, A. J., & Guptill, S. C.** (1995). *Elements of Cartography* (6th ed.). Wiley.
7. **Burrough, P. A., & McDonnell, R. A.** (1998). *Principles of Geographical Information Systems* (2nd ed.). Oxford University Press.
8. **Heywood, I., Cornelius, S., & Carver, S.** (2011). *An introduction to geographical information systems* (4th ed.). Pearson Education.

B. Software Manuals & Online Tutorials

QGIS (Open-source)	https://docs.qgis.org – Official Documentation
SOI Toposheets	https://surveyofindia.gov.in – Download sheet index & symbols
Map Reading	https://bhuvan.nrsc.gov.in – ISRO's geoportal
Cartography tutorials	https://carto.com/learn – Free lessons on map design
OpenStreetMap (OSM)	https://wiki.openstreetmap.org – Tagging schema & map editing
GeoJSON.io (map export)	https://geojson.io – For previewing/exporting spatial data

Year – 2; Semester – III

Semester – III: Paper – I

Geography of India

Year	Semester	Course Code	Course Type	Course Title	Credit
2	Semester- III	BECC301	Core Paper	**Geography of India**	4

Course Outcomes (COs)

CO Code	Course Outcome
CO1	Explain India's location, physiographic divisions, and major drainage systems.
CO2	Analyse climatic patterns of India with special reference to the monsoon mechanism.
CO3	Assess the distribution of soils, natural vegetation, and classify natural regions of India.
CO4	Evaluate population distribution, demographic challenges, and national population policies.
CO5	Discuss factors affecting Indian agriculture, major crops, and the socio-economic and ecological impacts of the Green Revolution.
CO6	Examine the distribution of key minerals, energy resources, and renewable energy in India.
CO7	Analyse factors of industrial localization, industrial regions, and the role of SEZs in India's economy.
CO8	Interpret patterns of transport networks, urbanization, urban sprawl, and associated challenges with reference to heritage cities like Varanasi.

Unit	Topics	No. of Lectures	Credit
Unit – I	India's Location and Its Neighbouring Countries; Physiographic Regions of India; Himalayan and Peninsular Drainage Systems	15	1
Unit – II	Climate of India; Mechanism of Indian Monsoons; Natural Vegetation, Soil Types and Their Distribution in India; Natural Regions of India; Population Distribution and Its Density; Population Problems and Policies in India; Factors Affecting Agriculture; Major Crops of India – Wheat, Rice, Sugarcane, Cotton; Green Revolution and its Socio-economic and Ecological Impacts; Major Crops of India – Wheat, Rice, Sugarcane, and Cotton	15	1
Unit – III	Natural Resources in India; Geographical Distribution and Production of Coal, Petroleum, Iron Ore, and Mica in India;	15	1

	Renewable Energy in India; Factor Affecting Localisation of Industries; Industrial Regions of India; Special Economic Zones		
Unit – IV	Transport in India – Road, Rail, Air, and Water; Structure of Indian Cities and Urban Sprawls; Heritage Cities of India - Varanasi; Geographical Patterns of Urbanisation and Associated Problems in India	15	1

Course Learning Outcomes (CLOs)

CLO Code	Course Learning Outcome	Bloom's Level
CLO1	Describe India's geographical location, political boundaries, and neighboring countries.	Remember, Understand
CLO2	Explain the physiographic regions of India and compare Himalayan and Peninsular drainage systems.	Understand, Analyse
CLO3	Illustrate the mechanism of Indian monsoons and discuss regional climatic variations.	Understand, Apply
CLO4	Identify and classify natural vegetation and soil types of India and delineate natural regions.	Remember, Understand, Apply
CLO5	Analyse the distribution and density of population in India and evaluate population policies.	Analyse, Evaluate
CLO6	Examine factors affecting Indian agriculture and assess production patterns of major crops—wheat, rice, sugarcane, and cotton.	Analyse, Evaluate
CLO7	Evaluate the socio-economic and ecological impacts of the Green Revolution in India.	Analyse, Evaluate
CLO8	Discuss the distribution and production of coal, petroleum, iron ore, mica, and the potential of renewable energy in India.	Understand, Analyse
CLO9	Analyse factors influencing localization of industries and describe major industrial regions and Special Economic Zones.	Analyse, Evaluate
CLO10	Interpret the geographical patterns of transport (road, rail, air, water), examine structure of Indian cities, urban sprawl, and evaluate problems of urbanization with special reference to Varanasi.	Apply, Analyse, Evaluate

Semester – III: Paper – II

Practical

Year	Semester	Course Code	Course Type	Course Title	Credit
2	Semester- III	BECP301	Core Paper	**Practical**	2

Course Outcomes (COs)

CO Code	Course Outcome
CO1	Classify different types of map projections and construct selected projections graphically (Polar Zenithal Stereographic, Simple Conic, Bonne's, Cylindrical Equal Area).
CO2	Explain properties and uses of Mercator's projection and UTM.
CO3	Prepare thematic maps (choropleth, isopleth, dot maps) manually and Analyse their properties and limitations.
CO4	Use GIS tools (QGIS) for georeferencing, digitization, tabular data entry, and visualization of spatial data with appropriate symbology.
CO5	Compare manual and GIS-based methods of thematic map preparation and interpretation.
CO6	Conduct field surveying using altimetry with clinometer and levelling instruments (dumpy level/auto level/total station).

Unit	Topics	No. of Lectures	Credit
Unit – I	Map Projections – Classification, Properties and Uses; Graphical Construction of Polar Zenithal Stereographic, Simple Conic, Bonne's and Cylindrical Equal Area Projections; Concept of Mercator's Projection and UTM; Thematic Mapping – Properties, Uses and Limitations; Cartographic Representation of Geospatial Data using Point, Line and Patches; Choropleths & Isopleths, Dot-maps	30	1
Unit – II	Preparation and Interpretation Thematic Maps Manually vs. using GIS Tools; Spatial and Attribute Data Entry: Georeferencing, Digitization and Tabular Data Entry in QGIS; Visualization of Point, Line and Polygon Features using Different Symbologies **Surveying: Altimetry using Indian Clinometer; Levelling (Using Dumpy Level/Auto Level/Total Station)**	30	1

Course Learning Outcomes (CLOs)

CLO Code	Course Learning Outcome	Bloom's Level
CLO1	Classify map projections and explain their properties and uses.	Remember, Understand

CLO2	Construct graphically polar zenithal stereographic, simple conic, Bonne's, and cylindrical equal area projections.	Apply
CLO3	Explain the concept of Mercator's projection and Universal Transverse Mercator (UTM).	Understand
CLO4	Construct and interpret thematic maps using point, line, and area symbols.	Apply, Analyse
CLO5	Prepare and evaluate choropleth, isopleth, and dot maps manually.	Apply, Analyse, Evaluate
CLO6	Compare manual and GIS-based methods of thematic mapping.	Analyse, Evaluate
CLO7	Perform georeferencing, digitization, and attribute data entry in QGIS.	Apply
CLO8	Visualize spatial features (point, line, polygon) using symbology in GIS.	Apply, Analyse
CLO9	Conduct altimetry using Indian clinometer and interpret slope profiles.	Apply
CLO10	Carry out levelling operations using Dumpy Level, Auto Level, or Total Station and prepare contour-based maps.	Apply, Analyse

Textbooks

1. Gregory, S. (1973). *Statistical Methods and the Geographer*. London: Longman.
2. Yeates, M. (1974). *An Introduction to Quantitative Analysis in Human Geography*. New York: McGraw Hill.
3. Hammond, R., & McCullagh, P. S. (1978). *Quantitative Techniques in Geography: An Introduction*. Oxford: Clarendon Press.
4. Mahmood, A. (2014). *Statistical Methods in Geographical Studies*. New Delhi: Rajesh Publications.
5. Clark, W. A. V., & Hosking, P. (1986). *Statistical Methods for Geographers*. New York: Wiley.

Indian Authors

6. Singh, R. L., & Singh, R. P. B. (2001). *Elements of Practical Geography*. Allahabad: Sharda Pustak Bhawan.

7. Singh, L. R. (2014). *Prayogik Bhugol ke Mool Tatva*. Allahabad: Sharda Pustak Bhawan.

8. Gopal Singh (2006). *Map Work and Practical Geography*. Allahabad: Vikas Publishing House.

9. Sharma, J. P. (2012). *Practical Geography*. Allahabad: Rastogi Publications.

10. Maurya, S. D. (2012). *Prayogik Bhugol*. Allahabad: Sharda Pustak Bhawan.

11. Tiwari, R. C. (2019). *Practical Geography*. New Delhi: Prayag Pustak Bhawan.

12. Alka Gautam (2010). *Practical Geography*. Jaipur: Rawat Publications.

Reference Books

13. Haining, R. (2003). *Spatial Data Analysis: Theory and Practice*. Cambridge: Cambridge University Press.

14. Fotheringham, A. S., Brunsdon, C., & Charlton, M. (2000). *Quantitative Geography: Perspectives on Spatial Data Analysis*. London: Sage.

15. Bailey, T. C., & Gatrell, A. C. (1995). *Interactive Spatial Data Analysis*. London: Longman.

16. de Smith, M. J., Goodchild, M. F., & Longley, P. A. (2018). *Geospatial Analysis: A Comprehensive Guide*. Leicester: Matador.

17. Batschelet, E. (1971). *Introduction to Mathematics for Life Scientists*. Springer. (Useful for spatial statistics basics.)

Online Resources

18. QGIS Documentation: qgis.org/en/docs

19. USGS (United States Geological Survey) Geospatial Data: usgs.gov

20. Survey of India (SOI): surveyofindia.gov.in

21. ESRI Spatial Statistics Resources: esri.com/en-us/arcgis/products/spatial-statistics

22. OpenIntro Statistics (Free Online Resource): openintro.org

Semester – III: Paper – III (**Minor Course**)

Introduction to Geography of India

Year	Semester	Course Code	Course Type	Course Title	Credit
2	Semester- III	BECC302	Core Paper	**Introduction to Geography of India**	6

Course Outcomes (COs)

CO Code	Course Outcome
CO1	Explain India's location, physiographic divisions, and drainage systems.
CO2	Analyse the climate of India with special focus on the mechanism of monsoons.
CO3	Assess the distribution of soils, natural vegetation, and classify natural regions of India.
CO4	Evaluate population distribution, density, problems, and policies in India.
CO5	Discuss factors affecting agriculture, distribution of major crops, and ecological–socioeconomic impacts of the Green Revolution.
CO6	Examine the distribution and production of mineral, energy, and renewable resources in India.
CO7	Analyse factors of industrial localization, industrial regions, and the role of Special Economic Zones (SEZs).
CO8	Interpret transport systems (road, rail, air, water) and their role in national integration.
CO9	Evaluate urban structure, sprawl, heritage cities (Varanasi), and associated urban problems in India.

Unit	Topics	No. of Lectures	Credit
Unit – I	India's Location and Its Neighbouring Countries; Physiographic Regions of India; Himalayan and Peninsular Drainage Systems	15	1
Unit – II	Climate of India; Mechanism of Indian Monsoons; Natural Vegetation, Soil Types and Their Distribution in India; Natural Regions of India; Population Distribution and Its Density; Population Problems and Policies in India	15	1
Unit – III	Factors Affecting Agriculture; Major Crops of India – Wheat, Rice, Sugarcane, Cotton; Green Revolution and its Socio-economic and Ecological Impacts	15	1
Unit – IV	Natural Resources in India; Geographical Distribution and Production of Coal, Petroleum, Iron Ore, and Mica in India; Renewable Energy in India	15	1
Unit – V	Factor Affecting Localisation of Industries; Industrial Regions of India; Special Economic Zones; Transport in India – Road, Rail, Air, and Water	15	1

Unit – VI	Structure of Indian Cities and Urban Sprawls; Heritage Cities of India – Varanasi; Geographical Patterns of Urbanisation and Associated Problems in India	15	1

Course Learning Outcomes (CLOs)

CLO Code	Course Learning Outcome	Bloom's Level
CLO1	Describe India's location, physiographic divisions, and major drainage systems.	Remember, Understand
CLO2	Explain the mechanism of Indian monsoons, and distribution of natural vegetation, soils, and natural regions.	Understand, Apply
CLO3	Analyse India's population distribution, density, population problems, and policies.	Analyse, Evaluate
CLO4	Discuss factors affecting agriculture and examine the distribution of major crops (wheat, rice, sugarcane, cotton).	Understand, Analyse
CLO5	Evaluate the socio-economic and ecological impacts of the Green Revolution in India.	Analyse, Evaluate
CLO6	Explain the distribution of mineral and energy resources (coal, petroleum, iron ore, mica) and assess the role of renewable energy in India.	Understand, Analyse, Evaluate
CLO7	Examine localization of industries, major industrial regions, and the significance of Special Economic Zones.	Analyse, Evaluate
CLO8	Interpret transport networks (road, rail, air, water), urbanization trends, and urban issues in Indian cities.	Apply, Analyse, Evaluate

Textbooks

1. Tiwari, R. C. (2019). *Geography of India*. Allahabad: Prayag Pustak Bhawan.
2. Khullar, D. R. (2018). *India: A comprehensive geography*. New Delhi: Kalyani Publishers.
3. Alka, G. (2019). *Geography of India*. Jaipur: Rawat Publications.
4. Singh, R. L. (1971). *India: A regional geography*. Varanasi: National Geographical Society of India.
5. Maurya, S. D. (2018). *Bharat ka bhugol* (in Hindi). Allahabad: Vasundhara Prakashan.
6. Singh, S. (2019). *Physical geography of India*. Allahabad: Prayag Pustak Bhawan.

Reference Books

7. Spate, O. H. K., & Learmonth, A. T. A. (1967). *India and Pakistan: A general and regional geography* (3rd ed.). London: Routledge.
8. Valdiya, K. S. (2010). *The making of India: Geodynamic evolution*. New York: Springer.
9. Maurya, S. D. (2016). *Manav bhugol* (in Hindi). Allahabad: Vasundhara Prakashan.
10. Husain, M. (2015). *Environment and ecology*. Jaipur: Rawat Publications.
11. Troll, C. (1972). *Geo-ecology of the mountainous regions of the tropical Americas*. Berlin: Borntraeger.

12. Singh, R. B. (2009). *Climate change and sustainable development*. New Delhi: Rawat Publications.
13. Maurya, S. D. (2017). *Population geography*. Allahabad: Vasundhara Prakashan.
14. Husain, M. (2015). *Human geography*. Jaipur: Rawat Publications.
15. Dyson, T., Cassen, R., & Visaria, L. (Eds.). (2004). *Twenty-first century India: Population, economy, human development, and the environment*. New Delhi: Oxford University Press.
16. Grigg, D. (2003). *An introduction to agricultural geography*. London: Routledge.
17. Sharma, T. C., & Coutinho, O. (2016). *Economic and commercial geography of India*. New Delhi: Vikas Publishing.
18. Saxena, H. M. (2013). *Environmental geography: Resource use, locational issues, sustainable development*. Jaipur: Rawat Publications.
19. Spate, O. H. K. (1957). *India, Pakistan and Ceylon: The regions*. London: Methuen.
20. Ramachandran, R. (1989). *Urbanisation and urban systems in India*. New Delhi: Oxford University Press.
21. Maurya, S. D. (2018). *Bharat ka nagarikaran* (in Hindi). Allahabad: Vasundhara Prakashan.
22. Pacione, M. (2009). *Urban geography: A global perspective* (3rd ed.). London: Routledge.
23. Rao, V. K. R. V. (2011). *Urbanisation in India: An economic perspective*. New Delhi: Concept Publishing.

Online Resources

24. Geological Survey of India – www.gsi.gov.in
25. Survey of India – www.surveyofindia.gov.in
26. India Meteorological Department – mausam.imd.gov.in
27. Forest Survey of India – www.fsi.nic.in

Year – 2; Semester – IV

Semester – IV: Paper – I

Economic Geography

Year	Semester	Course Code	Course Type	Course Title	Credit
2	Semester- IV	BECC401	Core Paper	**Economic Geography**	4

Course Outcomes (COs)

CO Code	Course Outcome
CO1	Explain the nature of economic geography, classification of resources, and spatial organization of economic activities.
CO2	Assess the global distribution of coal, petroleum, and renewable energy resources.
CO3	Analyse factors influencing agriculture and application of Von Thünen's and Whittlesey's models to agricultural regions.
CO4	Examine industrial location factors and evaluate Weber's industrial location theory.
CO5	Discuss the distribution and importance of iron–steel and cotton textile industries and interpret global patterns of industrialization and globalization.
CO6	Interpret transportation networks, trade flows, and the role of geographical factors in shaping trade.
CO7	Analyse international trade patterns, trade blocks, and agreements, and evaluate their role in globalization.

Unit	Topics	No. of Lectures	Credit
Unit – I	Economic Activities and Their Spatial Organisation; Meaning and Classification of Resources; World Distribution of Energy Resources – Coal and Petroleum; Global Patterns of Green Energy Production	15	1
Unit – II	Types of Agriculture; Factors Affecting Geographical Distribution of Agriculture; Agricultural Location Model of J. H. von Thünen; Agricultural Regions of the World by D. Whittlesey	15	1
Unit – III	Factors of Industrial Location; Industrial Location Theory by A. Weber; Iron Steel and Cotton Textile Industries; Global Patterns of Industrialisation and Globalisation of Industries	15	1
Unit – IV	Geography of Transportation Networks; Geographical Factors Affecting Trade; Patterns and Trends of International Trade; Trade as Drive to Globalisation; Trade Blocs and International Trade Agreements	15	1

Course Learning Outcomes (CLOs)

CLO Code	Course Learning Outcome	Bloom's Level
CLO1	Define economic activities and classify resources; explain the world distribution of coal and petroleum, along with global patterns of green energy.	Remember, Understand
CLO2	Describe types of agriculture, factors affecting agricultural distribution, and apply Von Thünen's model of agricultural location.	Understand, Apply
CLO3	Examine Whittlesey's classification of world agricultural regions and relate them to regional practices.	Understand, Analyse
CLO4	Explain factors of industrial location and assess Weber's theory of industrial location.	Understand, Analyse, Evaluate
CLO5	Analyse the development of iron & steel and cotton textile industries, and interpret global patterns of industrialisation and globalisation.	Analyse, Evaluate
CLO6	Interpret transportation networks and examine the role of geographical factors in trade.	Apply, Analyse
CLO7	Evaluate global patterns and trends of international trade, including the role of trade blocs and trade agreements in globalisation.	Analyse, Evaluate

Textbooks

1. Alexander, J. W. (1988). *Economic Geography*. New Delhi: Prentice Hall of India.
2. Hartshorne, T. A., & Alexander, J. W. (2010). *Economic Geography*. New Delhi: Prentice Hall.
3. Wheeler, J. O., Muller, P. O., Thrall, G. I., & Fik, T. J. (1998). *Economic Geography*. New York: John Wiley.
4. Lloyd, P. E., & Dicken, P. (1977). *Location in Space: A Theoretical Approach to Economic Geography*. London: Harper & Row.
5. Ramesh, A. (2010). *Economic Geography*. New Delhi: Rawat Publications.

Indian Authors

6. Maurya, S. D. (2014). *Arthik Bhugol (Economic Geography)*. Allahabad: Sharda Pustak Bhawan.

7. Tiwari, R. C. (2017). *Economic Geography*. New Delhi: Prayag Pustak Bhawan.

8. Alka Gautam (2010). *Economic Geography*. Jaipur: Rawat Publications.

9. Sharma, T. C., & Coutinho, O. (2010). *Economic and Commercial Geography of India*. New Delhi: Vikas Publishing.

Reference Books

10. Isard, W. (1960). *Methods of Regional Analysis: An Introduction to Regional Science*. Cambridge: MIT Press.

11. Knox, P. L., Agnew, J., & McCarthy, L. (2014). *The Geography of the World Economy*. London: Routledge.

12. Coe, N. M., Kelly, P. F., & Yeung, H. W. C. (2019). *Economic Geography: A Contemporary Introduction* (3rd ed.). Hoboken: Wiley-Blackwell.

13. Stutz, F. P., & Warf, B. (2014). *The World Economy: Geography, Business, Development*. New Delhi: Pearson.

14. Daniels, P. W., & Bradshaw, M. J. (2009). *Contemporary Economic Geography: Global Perspectives on Economic Space*. London: Routledge.

15. Liong, C. Y., & Morgan, W. B. (1980). *Economic Geography*. Oxford: Oxford University Press.

Online Resources

16. FAO (Food and Agriculture Organization of the United Nations). *Agriculture and Food Data*. Available at: fao.org

17. IEA (International Energy Agency). *World Energy Statistics and Balances*. Available at: iea.org

18. UNCTAD (United Nations Conference on Trade and Development). *International Trade and Development Data*. Available at: unctad.org

19. WTO (World Trade Organization). *Trade and Globalisation Reports*. Available at: wto.org

20. World Bank. *World Development Indicators*. Available at: worldbank.org

Semester – IV: Paper – II

Practicals

Year	Semester	Course Code	Course Type	Course Title	Credit
2	Semester- IV	BECP401	Core Paper	**Practical**	2

Course Outcomes (COs)

CO Code	Course Outcome
CO1	Differentiate between sampling and census methods of data collection, and prepare frequency tables and cross-tabulations.
CO2	Apply descriptive statistics (mean, median, mode, variance, standard deviation, coefficient of variation) for geographical data analysis.
CO3	Present data graphically using bar diagrams, histograms, frequency curves, scatter plots, and compute correlation (rank and product–moment).
CO4	Conduct spatial statistical analysis, including Nearest Neighbor Analysis (NNA) and spatial autocorrelation using QGIS.
CO5	Perform basic network analysis by calculating cyclomatic number, alpha, beta, and gamma indices.
CO6	Conduct surveying by measuring angles and distances using theodolite or total station.

Unit	Topics	No. of Lectures	Credit
Unit – I	Sources of Geographical Data; Data collection – Sampling vs. Census; Tabulation and Descriptive Statistics: Frequency Distribution Table, Cross Tabulation; Measurement of Central Tendencies (Mean, Median and Mode); Dispersion (Standard Deviation, Variance and Coefficient of Variation) Graphical Presentation of Data (Bar Diagram, Histogram, Frequency Curve); Scatter Plot; Rank Correlation and Product Moment Correlation	30	1
Unit – II	Spatial Statistics – Nearest Neighbour Analysis (NNA) (Manually and/or using QGIS) and Spatial Autocorrelation (QGIS); Network analysis – Cyclomatic Number, Calculation of Alpha, Beta and Gamma Values **Surveying: Measuring Angles and Ranging using Theodolite OR Total Station**	30	1
Course Learning Outcomes (CLOs)			

CLO Code	Course Learning Outcome	Bloom's Level
CLO1	Differentiate between primary and secondary sources of geographical data, and compare census and sampling methods.	Understand, Analyse
CLO2	Prepare frequency distribution tables, cross-tabulations, and compute measures of central tendency (mean, median, mode).	Apply
CLO3	Calculate measures of dispersion (standard deviation, variance, coefficient of variation) and interpret results.	Apply, Analyse
CLO4	Present geographical data graphically using bar diagrams, histograms, frequency curves, scatter plots, and correlation diagrams.	Apply, Analyse
CLO5	Compute and interpret rank correlation and product moment correlation for spatial datasets.	Apply, Analyse, Evaluate
CLO6	Perform spatial statistical techniques such as Nearest Neighbour Analysis (NNA) and spatial autocorrelation using manual and GIS-based methods.	Apply, Analyse
CLO7	Conduct network analysis (cyclomatic number, alpha, beta, gamma indices) and perform basic theodolite/Total Station surveying.	Apply, Analyse, Evaluate

Textbooks

1. Gregory, S. (1973). *Statistical Methods and the Geographer*. London: Longman.
2. Yeates, M. (1974). *An Introduction to Quantitative Analysis in Human Geography*. New York: McGraw Hill.
3. Hammond, R., & McCullagh, P. S. (1978). *Quantitative Techniques in Geography: An Introduction*. Oxford: Clarendon Press.
4. Mahmood, A. (2014). *Statistical Methods in Geographical Studies*. New Delhi: Rajesh Publications.
5. Clark, W. A. V., & Hosking, P. (1986). *Statistical Methods for Geographers*. New York: Wiley.

Indian Authors

6. Singh, R. L., & Singh, R. P. B. (2001). *Elements of Practical Geography*. Allahabad: Sharda Pustak Bhawan.

7. Singh, L. R. (2014). *Prayogik Bhugol ke Mool Tatva*. Allahabad: Sharda Pustak Bhawan.

8. Gopal Singh (2006). *Map Work and Practical Geography*. Allahabad: Vikas Publishing House.

9. Sharma, J. P. (2012). *Practical Geography*. Allahabad: Rastogi Publications.

10. Maurya, S. D. (2012). *Prayogik Bhugol*. Allahabad: Sharda Pustak Bhawan.

11. Tiwari, R. C. (2019). *Practical Geography*. New Delhi: Prayag Pustak Bhawan.

12. Alka Gautam (2010). *Practical Geography*. Jaipur: Rawat Publications.

Reference Books

13. Haining, R. (2003). *Spatial Data Analysis: Theory and Practice*. Cambridge: Cambridge University Press.

14. Fotheringham, A. S., Brunsdon, C., & Charlton, M. (2000). *Quantitative Geography: Perspectives on Spatial Data Analysis*. London: Sage.

15. Bailey, T. C., & Gatrell, A. C. (1995). *Interactive Spatial Data Analysis*. London: Longman.

16. de Smith, M. J., Goodchild, M. F., & Longley, P. A. (2018). *Geospatial Analysis: A Comprehensive Guide*. Leicester: Matador.

17. Batschelet, E. (1971). *Introduction to Mathematics for Life Scientists*. Springer. (Useful for spatial statistics basics.)

Online Resources

18. QGIS Documentation: qgis.org/en/docs

19. USGS (United States Geological Survey) Geospatial Data: usgs.gov

20. Survey of India (SOI): surveyofindia.gov.in

21. ESRI Spatial Statistics Resources: esri.com/en-us/arcgis/products/spatial-statistics

22. OpenIntro Statistics (Free Online Resource): openintro.org

Year – 3; Semester – V

Semester – V: Paper – I

Evolution of Geographical Thought

Year	Semester	Course Code	Course Type	Course Title	Credit
3	Semester- V	BECC501	Core Paper	**Evolution of Geographical Thought**	4

Course Outcomes (COs)

CO Code	Course Outcome
CO1	Describe the nature of geographical knowledge in ancient India through Vedic, Puranic, and epic traditions, and contributions of Indian scholars like Aryabhatta, Bhaskaracharya, Brahmagupta, and Varahmihira.
CO2	Explain the geographical contributions of Greek, Roman, and Arab scholars during classical and medieval periods, and evaluate the role of the Age of Exploration.
CO3	Analyse the German School of Thought and its key contributors including Kant, Humboldt, Ritter, Richthofen, Ratzel, and Hettner.
CO4	Discuss the contributions of the French School, particularly Blache and Brunhes, in shaping human and regional geography.
CO5	Evaluate the American School's contributions (Sample, Huntington, Sauer, Hartshorne) and their impact on modern geography.
CO6	Assess the British School's contributions (Mackinder, Herbertson, Stamp) in the development of geography as a discipline.

Unit	Topics	No. of Lectures	Credit
Unit – I	Geographical Knowledge in Ancient India (*Ved*, *Purana* and Epics); Contributions of *Aryabhatta*, *Bhaskracharya*, *Brahmgupt* and *Varahmihira*	15	1
Unit – II	Contribution of Greek and Roman Scholars; Contribution of Arab Scholars in Middle Ages, Age of Explorations in Geography	15	1
Unit – III	German School of Thought – Kant, Humboldt, Ritter, Richthofen, Ratzel, Hettner; French School of Thought – Contribution of Blache & Brunhes	15	1
Unit – IV	American School – Contributions of E. C. Sample, Huntington, Carl O. Sauer, and Richard Hartshorne; British School – Contribution of Mackinder, Herbertson, and L. D. Stamp	15	1

Course Learning Outcomes (CLOs)

CLO Code	Course Learning Outcome	Bloom's Level
CLO1	Trace the development of geographical knowledge in ancient India through Vedas, Puranas, and Epics, and contributions of Aryabhatta, Bhaskaracharya, Brahmagupta, and Varahmihira.	Remember, Understand
CLO2	Explain the contributions of Greek and Roman scholars to early geography.	Understand, Analyse
CLO3	Discuss the contributions of Arab scholars during the Middle Ages and evaluate the role of explorations in the growth of geography.	Understand, Analyse, Evaluate
CLO4	Examine the German School of Thought through the works of Kant, Humboldt, Ritter, Richthofen, Ratzel, and Hettner.	Understand, Analyse
CLO5	Analyse the French School of Thought with emphasis on contributions of Blache and Brunhes.	Analyse, Evaluate
CLO6	Evaluate the American School of Geography through the works of Sample, Huntington, Sauer, and Hartshorne.	Analyse, Evaluate

Textbooks

1. Husain, Majid (2010). *Evolution of Geographical Thought*. New Delhi: Rawat Publications.
2. Lal, R. S. (2019). *A Textbook of Geographical Thought*. Meerut: Sharda Pustak Bhawan.
3. Dixit, R. D. (2009). *Geographical Thought: A Contextual History of Ideas*. New Delhi: Pearson.
4. Adhikari, Sudeepta (2015). *Fundamentals of Geographical Thought*. Jaipur: Rawat Publications.
5. Martin, Geoffrey J. (2005). *All Possible Worlds: A History of Geographical Ideas*. Oxford: Oxford University Press.

Indian Authors

6. Singh, R. L. (2012). *Elements of Geographical Thought*. Allahabad: Sharda Pustak Bhawan.
7. Tiwari, R. C. (2017). *Geographical Thought*. New Delhi: Prayag Pustak Bhawan.
8. Maurya, S. D. (2011). *Bhaugolik Vichar*. Allahabad: Sharda Pustak Bhawan.
9. Sharma, J. P. (2015). *Geographical Thought*. Rastogi Publications.
10. Singh, S. (2009). *Bhaugolik Vichardhara*. Allahabad: Vasundhara Prakashan.

Reference Books

11. Johnston, R. J., Gregory, D., Pratt, G., & Watts, M. (2000). *The Dictionary of Human Geography*. Oxford: Blackwell.
12. Livingstone, D. N. (1992). *The Geographical Tradition*. Oxford: Blackwell.
13. Stoddart, D. R. (1986). *On Geography and Its History*. Oxford: Blackwell.
14. Holt-Jensen, A. (2009). *Geography: History and Concepts*. London: Sage.
15. Hartshorne, R. (1959). *Perspective on the Nature of Geography*. Chicago: Rand McNally.

Online Resources

16. Internet Encyclopedia of Philosophy (IEP): iep.utm.edu
17. Stanford Encyclopedia of Philosophy (SEP): plato.stanford.edu
18. Indian National Science Academy – Ancient Indian Contributions: insaindia.res.in
19. Cambridge University Press – Journals in Geography: cambridge.org/core/journals
20. Association of American Geographers (AAG): aag.org

Semester – V: Paper – II

Cartography, Remote Sensing and GIS

Year	Semester	Course Code	Course Type	Course Title	Credit
3	Semester- V	BECC502	Core Paper	**Cartography, Remote Sensing and GIS**	4

Course Outcomes (COs)

CO Code	Course Outcome
CO1	Explain the scope, historical development, and principles of cartography, map design, and geovisualisation.
CO2	Apply GIS software (QGIS/ArcGIS) to prepare cartographic outputs and understand participatory mapping approaches such as OpenStreetMap.
CO3	Describe the principles, components, and development of remote sensing and electromagnetic radiation characteristics relevant for earth observation.
CO4	Analyse aerial photographs and satellite imagery through visual interpretation and digital image processing, including classification techniques.
CO5	Conduct land-use and land-cover mapping using remote sensing datasets.
CO6	Explain the evolution, components, and data models (raster and vector) in GIS, and apply concepts of topology and spatial relationships.
CO7	Demonstrate the role of WebGIS, Mobile GIS, GPS, and GNSS in applied geographic studies.

Unit	Topics	No. of Lectures	Credit
Unit – I	Definition and Scope of Cartography; Historical Development of Map-making; Basic Map Elements; Principles of Map Design; Definition and Evolution of Geovisualisation, Digital Cartography; GIS Software i.e. QGIS/ArcGIS for Cartographic Outputs; Crowd-sourced and Participatory Mapping (OpenStreetMap)	15	1
Unit – II	Remote Sensing: Definition and Components; Historical Development; Electromagnetic Radiation (EMR): Characteristics and Spectral Bands useful in Remote Sensing; Concept of Spectral Signature; Interaction of EMR with Atmosphere and Surface Features of The Earth; Concept of Resolutions in Remote Sensing; Major Platform and Sensors	15	1
Unit – III	Geometry of an Aerial Photograph; Visual Image Interpretation vs. Digital Image Processing; Image Classification (Supervised and Unsupervised); Land-use and Land-cover Mapping	15	1

Unit – IV	Definition, Scope and Evolution of GIS; Components of GIS; Spatial vs. Non-spatial (Attribute) Data; Raster and Vector Data; Topology and Spatial Relationships; WebGIS and Mobile GIS; GPS and GNSS; Applications of GIS	15	1

Course Learning Outcomes (CLOs)

CLO Code	Course Learning Outcome	Bloom's Level
CLO1	Define cartography, explain its historical development, and identify basic map elements.	Remember, Understand
CLO2	Apply principles of map design and evaluate the role of geovisualisation and digital cartography in modern mapping.	Apply, Analyse, Evaluate
CLO3	Operate GIS software (QGIS/ArcGIS) for generating cartographic outputs and apply participatory mapping tools such as OpenStreetMap.	Apply, Analyse
CLO4	Define remote sensing, describe its historical development, and identify key components of the remote sensing system.	Remember, Understand
CLO5	Explain electromagnetic radiation (EMR), its spectral characteristics, and interaction with the atmosphere and earth's surface.	Understand, Analyse
CLO6	Interpret the concept of spectral signatures and resolutions (spatial, spectral, temporal, radiometric).	Understand, Apply
CLO7	Identify major platforms and sensors used in aerial and satellite remote sensing.	Remember, Understand
CLO8	Compare visual image interpretation with digital image processing and apply supervised and unsupervised classification techniques.	Apply, Analyse
CLO9	Discuss the principles and applications of GIS, including spatial and non-spatial data, raster and vector models, and topology.	Understand, Analyse
CLO10	Evaluate the emerging applications of WebGIS, Mobile GIS, GPS, and GNSS in geographical studies and decision-making.	Analyse, Evaluate

Textbooks

1. Singh, R. L. (2009). *Elements of Practical Geography*. Allahabad: Sharda Pustak Bhawan.
2. Gupta, R. P. (2018). *Remote Sensing Geology*. New Delhi: Springer.
3. Heywood, I., Cornelius, S., & Carver, S. (2011). *An Introduction to Geographical Information Systems*. London: Pearson.
4. Campbell, J. B., & Wynne, R. H. (2011). *Introduction to Remote Sensing*. New York: Guilford Press.
5. Burrough, P. A., & McDonnell, R. A. (2015). *Principles of Geographical Information Systems*. Oxford: Oxford University Press.
6. Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2015). *Remote Sensing and Image Interpretation*. Hoboken: Wiley.

Indian Authors
7. Sharma, J. P. (2010). *Prayogik Bhugol*. Allahabad: Rastogi Publications.
8. Maurya, S. D. (2016). *GIS and Remote Sensing*. New Delhi: Sharda Pustak Bhawan.
9. Singh, S. (2015). *Remote Sensing, GIS aur Bhaugolik Suchna Pranali*. Gorakhpur: Vasundhara Prakashan.
10. Tiwari, R. C. (2014). *A Textbook of Remote Sensing and GIS*. New Delhi: Pravalika Publications.
11. Gautam, A. (2012). *Concepts of Remote Sensing and GIS*. Jaipur: Rawat Publications.
12. Maurya, S. D. (2018). *Prayogik Bhaugol aur GIS*. Allahabad: Sharda Pustak Bhawan.

Reference Books
13. Dent, B. D., Torguson, J. S., & Hodler, T. W. (2008). *Cartography: Thematic Map Design*. New York: McGraw-Hill.
14. Monmonier, M. (1996). *How to Lie with Maps*. Chicago: University of Chicago Press.
15. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographic Information Systems and Science*. Hoboken: Wiley.
16. Jensen, J. R. (2016). *Introductory Digital Image Processing: A Remote Sensing Perspective*. Hoboken: Pearson.
17. Tomlinson, R. (2019). *Thinking about GIS: Geographic Information System Planning for Managers*. Redlands: ESRI Press.

Online Resources
18. National Remote Sensing Centre (NRSC), ISRO: nrsc.gov.in
19. Survey of India (SOI): surveyofindia.gov.in
20. OpenStreetMap: openstreetmap.org
21. USGS Earth Explorer: earthexplorer.usgs.gov
22. NASA Earth Data: earthdata.nasa.gov
23. QGIS Documentation: qgis.org/en/docs
24. ESRI GIS Resources: esri.com/en-us/arcgis

Semester – V: Paper – III

Practical

Year	Semester	Course Code	Course Type	Course Title	Credit
3	Semester- IV	BECP501	Core Paper	**Practical**	2

Course Outcomes (COs)

CO Code	Course Outcome
CO1	Determine photo scale using maps and apply stereo-visualisation techniques for aerial photograph interpretation.
CO2	Identify physical and cultural features using vertical aerial photographs and visual image interpretation.
CO3	Process satellite imagery in QGIS including visualisation, subsetting, and mosaicking.
CO4	Perform supervised and unsupervised classification using satellite data from portals such as USGS, Copernicus, and Bhuvan/Bhoonidhi.
CO5	Use GPS, mobile GPS, and GNSS devices for spatial data acquisition.
CO6	Conduct geotagging of field locations using handheld GPS or Android-based devices.

Unit	Topics	No. of Lectures	Credit
Unit – I	Determination of Photo Scale (Using Map), Stereo-Visualisation; Visual Identification of Objects on a Vertical Aerial Photograph; Visual Image Interpretation; Visualisation of Satellite Imagery in QGIS; Subsetting and Mosaicking	30	1
Unit – II	Unsupervised and Supervised Classification (Data from USGS/Copernicus/Bhoonidhi Portals); GPS, Mobile GPS and GNSS **Surveying: Geotagging using GPS (Handheld/Android Phone)**	30	1

Course Learning Outcomes (CLOs)

CLO Code	Course Learning Outcome	Bloom's Level
CLO1	Determine photo scale using maps and perform stereo-visualisation for aerial photographs.	Apply
CLO2	Identify and interpret objects on vertical aerial photographs through visual techniques.	Apply, Analyse
CLO3	Visualise and process satellite imagery in QGIS, including subsetting and mosaicking.	Apply, Analyse
CLO4	Perform unsupervised and supervised image classification using datasets from USGS/Copernicus/Bhoonidhi portals.	Apply, Analyse

CLO5	Operate GPS, Mobile GPS, and GNSS devices for spatial data collection.	Apply
CLO6	Conduct geotagging of field locations using handheld GPS or smartphones.	Apply, Analyse
CLO7	Integrate photo-interpretation, image classification, and GPS techniques for generating geospatial datasets.	Apply, Analyse, Evaluate

Textbooks

1. Campbell, J. B., & Wynne, R. H. (2011). *Introduction to Remote Sensing*. New York: Guilford Press.
2. Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2015). *Remote Sensing and Image Interpretation*. Hoboken: Wiley.
3. Heywood, I., Cornelius, S., & Carver, S. (2011). *An Introduction to Geographical Information Systems*. London: Pearson.
4. Gupta, R. P. (2018). *Remote Sensing Geology*. New Delhi: Springer.

Indian Authors

5. Maurya, S. D. (2016). *GIS and Remote Sensing*. Allahabad: Sharda Pustak Bhawan.
6. Singh, S. (2015). *Remote Sensing, GIS aur Bhaugolik Suchna Pranali*. Gorakhpur: Vasundhara Prakashan.
7. Tiwari, R. C. (2014). *A Textbook of Remote Sensing and GIS*. New Delhi: Pravalika Publications.
8. Sharma, J. P. (2010). *Prayogik Bhugol*. Meerut: Rastogi Publications.
9. Maurya, S. D. (2018). *Prayogik Bhaugol aur GIS*. Allahabad: Sharda Pustak Bhawan.

Reference Books

10. Jensen, J. R. (2016). *Introductory Digital Image Processing: A Remote Sensing Perspective*. Hoboken: Pearson.
11. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographic Information Systems and Science*. Hoboken: Wiley.
12. Wolf, P. R., Dewitt, B. A., & Wilkinson, B. E. (2014). *Elements of Photogrammetry with Applications in GIS*. New York: McGraw-Hill.
13. Schowengerdt, R. A. (2007). *Remote Sensing: Models and Methods for Image Processing*. Burlington: Academic Press.

Online Resources

14. National Remote Sensing Centre (NRSC), ISRO: nrsc.gov.in
15. Bhoonidhi Data Portal (ISRO): bhoonidhi.nrsc.gov.in
16. USGS Earth Explorer: earthexplorer.usgs.gov
17. Copernicus Open Access Hub: scihub.copernicus.eu
18. QGIS Documentation: qgis.org/en/docs
19. OpenStreetMap: openstreetmap.org

Year – 3; Semester – VI

Semester – VI: Paper – I

Environmental Geography

Year	Semester	Course Code	Course Type	Course Title	Credit
3	Semester- VI	BECC601	Core Paper	**Environmental Geography**	4

Course Outcomes (COs)

CO Code	Course Outcome
CO1	Explain the concept of environment as an ecosystem, energy flow through food chains and food webs, and major Geobiochemical cycles.
CO2	Assess the significance of biodiversity, its conservation strategies, and implications of global warming and human-induced climate change.
CO3	Define and differentiate concepts of hazard, disaster, risk, and vulnerability in the context of environmental management.
CO4	Classify natural and anthropogenic disasters and evaluate disaster management strategies.
CO5	Analyse case-specific disasters such as floods, droughts, cyclones, earthquakes, tsunamis, landslides, chemical and nuclear hazards, and suggest precautionary measures (do's and don'ts).

Unit	Topics	No. of Lectures	Credit
Unit – I	Environment as an Ecosystem; Energy flow in Ecosystem – Food Chain and Food Webs; Concept Geobiochemical Cycles	15	1
Unit – II	Biodiversity and Its Conservation; Global Warming and Man-Induced Climate Change	15	1
Unit – III	Concepts of Hazard, Disaster, Risk, and Vulnerability; Types of Disasters; Disaster Management Strategies	15	1
Unit – IV	Floods, Droughts, Cyclone, Earthquake, Tsunami, Landslides, Chemical and Nuclear Disasters; Do's and Don'ts During Disasters	15	1

Course Learning Outcomes (CLOs)

CLO Code	Course Learning Outcome	Bloom's Level
CLO1	Explain the concept of environment as an ecosystem and describe energy flow through food chains, food webs, and biogeochemical cycles.	Understand, Remember
CLO2	Discuss biodiversity and evaluate strategies for its conservation.	Understand, Evaluate
CLO3	Analyse the causes and consequences of global warming and human-induced climate change.	Analyse, Evaluate
CLO4	Define hazard, disaster, risk, and vulnerability; classify types of disasters.	Remember, Understand
CLO5	Examine disaster management strategies and frameworks at global, national, and local levels.	Understand, Analyse, Evaluate
CLO6	Describe the occurrence and impacts of natural disasters such as floods, droughts, cyclones, earthquakes, tsunamis, and landslides.	Remember, Understand
CLO7	Evaluate preparedness measures and Do's and Don'ts for managing chemical, nuclear, and natural disasters.	Apply, Evaluate

Textbooks

1. Odum, E. P., & Barrett, G. W. (2005). *Fundamentals of Ecology*. Belmont: Brooks Cole.
2. Dash, M. C. (2012). *Fundamentals of Ecology*. New Delhi: Tata McGraw Hill.
3. Botkin, D. B., & Keller, E. A. (2014). *Environmental Science: Earth as a Living Planet*. Hoboken: Wiley.
4. Saxena, H. M. (2018). *Environmental Geography*. Jaipur: Rawat Publications.
5. Savindra Singh (2014). *Paryavaran Bhugol*. Allahabad: Prayag Pustak Bhawan.
6. Tiwari, R. C. (2014). *Environmental Geography*. New Delhi: Pravalika Publications.

Indian Authors

7. Maurya, S. D. (2016). *Paryavaran Bhugol*. Allahabad: Sharda Pustak Bhawan.

8. Alka Gautam (2015). *Environmental Geography*. Jaipur: Rawat Publications.

9. Sharma, P. D. (2010). *Ecology and Environment*. Meerut: Rastogi Publications.

10. Sharma, J. P. (2012). *Disaster Management*. Meerut: Rastogi Publications.

Reference Books

11. Cutter, S. L. (2012). *Hazards, Vulnerability, and Environmental Justice*. London: Routledge.

12. Smith, K. (2013). *Environmental Hazards: Assessing Risk and Reducing Disaster*. London: Routledge.

13. Bryant, E. (2005). *Natural Hazards*. Cambridge: Cambridge University Press.

14. Coppola, D. P. (2015). *Introduction to International Disaster Management*. Burlington: Elsevier.

15. Shaw, R., & Krishnamurthy, R. (2009). *Disaster Management: Global Challenges and Local Solutions*. Hyderabad: Universities Press.

Online Resources

16. Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India: moef.gov.in

17. National Disaster Management Authority (NDMA), Government of India: ndma.gov.in

18. United Nations Office for Disaster Risk Reduction (UNDRR): undrr.org

19. IPCC Reports on Climate Change: ipcc.ch

20. Global Biodiversity Information Facility (GBIF): gbif.org

Semester – VI: Paper – II

Regional Geography

Year	Semester	Course Code	Course Type	Course Title	Credit
3	Semester- VI	BECC602	Core Paper	**Regional Geography**	4

Course Outcomes (COs)

CO Code	Course Outcome
CO1	Define and explain the concept of geographical regions, including formal, functional, and planning regions.
CO2	Describe the nature, objectives, and scope of regional planning.
CO3	Differentiate between development and underdevelopment and Analyse the concept of sustainable development.
CO4	Evaluate the causes of regional disparities at the global scale.
CO5	Analyse the resource base, industrial development (iron–steel, cotton), and agricultural regions of the USA.
CO6	Analyse the resource base, industrial development (iron–steel, cotton), and agricultural regions of Brazil.

Unit	Topics	No. of Lectures	Credit
Unit – I	Definition and Concept of Geographical Regions; Formal and Functional Regions; Concept of Planning Regions; Regional Planning, and Its Objectives	15	1
Unit – II	Concept of Development and Underdevelopment; Concept of Sustainable Development; Causes of Regional Disparities in World	15	1
Unit – III	Study of USA with Reference to Resource Base (Iron Ore, Coal and Petroleum; Industries – Iron and Steel, and Cotton); Agricultural Regions of USA	15	1
Unit – IV	Study of Brazil with Reference to Resource Base (Iron Ore, Coal and Petroleum; Industries – Iron and Steel, and Cotton); Agricultural Regions of Brazil	15	1

Course Learning Outcomes (CLOs)

CLO Code	Course Learning Outcome	Bloom's Level
CLO1	Define and explain the concept of geographical regions, distinguish between formal and functional regions, and describe the idea of planning regions.	Remember, Understand
CLO2	Analyse the objectives of regional planning and evaluate its role in reducing disparities.	Analyse, Evaluate

CLO3	Discuss the concepts of development, underdevelopment, and sustainable development in global context.	Understand, Analyse
CLO4	Examine causes of regional disparities across the world with suitable examples.	Analyse, Evaluate
CLO5	Assess the resource base of USA (iron ore, coal, petroleum) and its role in industrial and agricultural development.	Understand, Analyse, Evaluate
CLO6	Evaluate the industrial (iron & steel, cotton textiles) and agricultural regions of USA using location models and spatial patterns.	Analyse, Evaluate
CLO7	Interpret Brazil's resource base, industries, and agricultural regions, and compare its development trajectory with that of the USA.	Understand, Analyse, Evaluate

Textbooks

1. Blij, H. J. de, & Muller, P. O. (2010). *Geography: Realms, Regions and Concepts*. Hoboken: Wiley.
2. Hussain, M. (2017). *Evolution of Geographical Thought*. Jaipur: Rawat Publications.
3. Saxena, H. M. (2014). *Economic Geography*. Jaipur: Rawat Publications.
4. Singh, J. (2015). *An Introduction to Regional Planning*. New Delhi: Concept Publishing.
5. Tiwari, R. C. (2014). *Economic Geography*. New Delhi: Pravalika Publications.

Indian Authors

6. Maurya, S. D. (2017). *Aarthik Bhugol*. Allahabad: Sharda Pustak Bhawan.
7. Alka Gautam (2016). *Economic Geography*. Jaipur: Rawat Publications.
8. Dubey, R. N. (2015). *Manchitra aur Kshetriya Yojana*. Allahabad: Vasundhara Prakashan.
9. Saxena, H. M. (2016). *Regional Development and Planning*. Jaipur: Rawat Publications.
10. Savindra Singh (2012). *Arthik evam Kshetriya Bhugol*. Allahabad: Prayag Pustak Bhawan.

Reference Books

11. Glasson, J., & Marshall, T. (2007). *Regional Planning*. London: Routledge.
12. Friedman, J., & Alonso, W. (2017). *Regional Development and Planning: A Reader*. New Delhi: Concept Publishing.
13. Dicken, P. (2015). *Global Shift: Mapping the Changing Contours of the World Economy*. New York: Guilford Press.
14. Knox, P. L., & Marston, S. A. (2013). *Places and Regions in Global Context*. London: Pearson.
15. Hartshorne, R. (1960). *Perspective on the Nature of Geography*. Chicago: Rand McNally.

Online Resources

16. United Nations Development Programme (UNDP): undp.org
17. World Bank Open Data: data.worldbank.org
18. Organisation for Economic Co-operation and Development (OECD): oecd.org
19. United Nations Sustainable Development Goals (SDGs): sdgs.un.org
20. CIA World Factbook (for USA and Brazil): cia.gov/the-world-factbook

Semester – VI: Paper – III

Practical

Year	Semester	Course Code	Course Type	Course Title	Credit
3	Semester- IV	BECP601	Core Paper	**Practical**	2

Course Outcomes (COs)

CO Code	Course Outcome
CO1	Prepare a field book and apply systematic steps and methods for field report preparation.
CO2	Demonstrate understanding of research methodology in geographical fieldwork.
CO3	Identify and Analyse physical, social, cultural, and economic aspects during a field trip or village survey.
CO4	Conduct surveying using Auto Level, Dumpy Level, or Total Station for data collection.
CO5	Apply questionnaire-based surveys or other field techniques for socio-economic data collection.
CO6	Compile, interpret, and present field data in the form of a structured tour report.

Unit	Topics	No. of Lectures	Credit
Unit – I	How to Prepare Field Book, Steps and Methods for Preparing Tour Report, Methodology for Research in Field Trip, Various Aspects of Study in Field Trip, Preparation of Surveying in a Field Trip (30 Contact Hours Before the Field Trip / Survey / Tour)	30	1
Unit – II	Field Survey (Surveying Using Auto Level/Dumpy Level/Total Station) / Village Survey (Questionnaire OR Any Other Method) / Field Trip/Geographical Tour	--	1

Course Learning Outcomes (CLOs)

CLO Code	Course Learning Outcome	Bloom's Level
CLO1	Prepare a field book and design research methodology for geographical fieldwork or survey.	Understand, Apply
CLO2	Collect primary data through field surveys, village surveys, or geographical tours using appropriate methods (questionnaire, observation, instruments).	Apply
CLO3	Operate surveying instruments such as Auto Level, Dumpy Level, or Total Station for measurement and mapping.	Apply, Analyse
CLO4	Compile, tabulate, and interpret field data for preparing a systematic tour or survey report.	Apply, Analyse, Evaluate

CLO5	Demonstrate teamwork, organisational skills, and ethical responsibility during field studies and reporting.	Apply, Evaluate

Textbooks

1. Misra, R. P., & Ramesh, A. (1989). *Fundamentals of Cartography*. New Delhi: Concept Publishing.
2. Monkhouse, F. J., & Wilkinson, H. R. (2008). *Maps and Diagrams: Their Compilation and Construction*. New Delhi: B.I. Publications.
3. Hussain, M. (2015). *Methodology of Geographical Research*. Jaipur: Rawat Publications.
4. Rana, Tejvir Singh (2016). *Fieldwork in Geography*. Jaipur: Rawat Publications.

Indian Authors

6. Maurya, S. D. (2016). *Bhoogol Mein Kshetriya Paryatan Evam Kshetriya Adhyayan*. Allahabad: Sharda Pustak Bhawan.
7. Dixit, R. S. (2010). *Field Techniques and Research Methods in Geography*. New Delhi: Prentice Hall India.
8. Dubey, R. N. (2015). *Bhugol Mein Kshetriya Adhyayan evam Prayog*. Gorakhpur: Vasundhara Prakashan.
9. Sharma, J. P. (2014). *Paryavaran evam Bhugol Mein Kshetriya Adhyayan*. Allahabad: Kitab Mahal.
10. Singh, Savindra (2006). *Bhoogol Mein Anusandhan Vidhiyaan*. Allahabad: Prayag Pustak Bhawan.

Reference Books

11. Clifford, N., Cope, M., Gillespie, T., & French, S. (2016). *Key Methods in Geography*. London: Sage.
12. Evans, M., Newell, J., & Rogers, K. (2015). *Fieldwork in Geography: Reflections, Perspectives and Actions*. Dordrecht: Springer.
13. Scheyvens, R., & Storey, D. (2014). *Development Fieldwork: A Practical Guide*. London: Sage.
14. Flowerdew, R., & Martin, D. (2005). *Methods in Human Geography: A Guide for Students Doing a Research Project*. Harlow: Pearson Education.

Year – 4; Semester – VII	B.A. (Hons.)

Semester – VII: Paper – I

Advanced Geomorphology

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester-VII	BECC701	Core Paper	**Advanced Geomorphology**	4

Course outcomes:

Students will be able to understand

- The Earth's geomorphic transition from the beginning to the present day.
- Plate tectonics and related movements.
- Landforms carved by various agents of erosion.

Unit	Topics	No. of Lectures	Credit
Unit – I	Definition and Scope of Geomorphology; Principles of Geomorphology; Concept of Time in Geomorphology: Cyclic, Graded, and Steady state; Concept of Morphogenetic Regions; Concept of Dynamic Equilibrium; Recent Trends in Geomorphology	15	1
Unit – II	Landforms in Humid, Arid, Glacial, and Periglacial Environments; Models of Landscape Development by W.M. Davis, W. Penck, and M. Morisawa; Polycyclic Landforms	15	1
Unit – III	Morphometric Analysis of Relief: Basin Morphometry, Hypsographic Curve, Altimetry Frequency Curve, Histogram and Clinographic Curve; Drainage Morphometry: Strahler's Method of Stream Ordering, Drainage Frequency, Density and Texture	15	1
Unit – IV	Applied Geomorphology – Relevance of Geomorphologic Knowledge to Regional Planning, Road and Dam Engineering Construction, Mining, Urbanization, and Natural Hazards; Human Beings as Geomorphic Agents	15	1

Suggested Readings:

1. Singh, Savindra (2018), *Geomorphology* (Eng./Hindi) Allahabad, India: Prayag Pustak
2. Huggett, R.J. (2007): *Fundamentals of Geomorphology*. New York, U.S.A.: Routledge.
3. Khullar, D.R. (2012). *Physical Geography*. New Delhi. India: Kalyani Publishers.
4. Strahler, A. H. and Strahler, A N. (2001): *Modern Physical Geography* (4/E). New York, U.S.A.: John Wiley and Sons, Inc.
5. Thornbury, W. D. (2004): *Principal of Geomorphology.* New York, U.S.A.: Wiley.
6. Bloom, A. L. (2003). Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, New Delhi, India: Prentice-Hall of India

Semester – VII: Paper – II

Advanced Climatology

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester-VII	BECC701	Core Paper	**Advanced Climatology**	4

Course Learning Outcomes

On completion of this course, learners will be able to:

- Understand the basic and advanced concept of Climate
- Understand the mean global atmospheric circulations and disturbances, world climate systems, climatic variability and changes.

Unit	Topics	No. of Lectures	Credit
Unit – I	Definition and Scope of Climatology; Climatology and Meteorology, Atmospheric Dynamics – Tri-cellular Meridional Circulation, Penman Model; Concepts of Atmospheric Stability and Instability; Air Masses, Fronts and Cyclogenesis; Anticyclones; Precipitation: Related Forms and Theories of Precipitation	15	1
Unit – II	Mechanism of Monsoon – Traditional vs. Recent Concepts; Impact of El-Nino and Southern Oscillation (ENSO); Indian Ocean Dipole (IOD); Climatic Classifications – Empirical (by Koppen, Thornthwaite) vs. Genetic (by Strahlar)	15	1
Unit – III	Climate Change – Meaning and Concept, Measuring Climate Change; Stress, Exposure, Risk, and Vulnerability Related to Climatic Change; Tropical Cyclones as Climatic Hazards	15	1
Unit – IV	Applied Climatology: Climate and Natural Vegetation, Climate and Agriculture, Heat Islands; Weather Forecasting and Synoptic Climatology	15	1

Suggested Readings:

1. Ahrens, C.D. (2012): Essentials of Meteorology: An Invitation to the Atmosphere; Cengage Learning, Boston

2. Ahrens, C.D., Jackson, P.L., Jackson, C.E.J. and Jackson, C.E.O. (2012): Meteorology Today: An Introduction to Weather, Climate and the Environment; Cengage Learning; Boston

3. Barry, R.G. and Chorley, R.J. (2003): Atmosphere, Weather and Climate; Psychology Press, Hove; East Sussex.

4. Chawan S.V. (ed) (2015): Physical Geography, Paper I, Published by Director (I/C), Institute of Distance and Open Learning, University of Mumbai.

5. Critchfield, H.J., (1975): general Climatology, Prentice Hall, New Jersey.

6. Lal D.S. (1997): Climatology; Sharda Pustak Bhavan; Allahabad

7. Lydolph, P.E.(1985): The Climate of the Earth, Rowman Nad Allanheld, Totowa, New Jersey.

8. Mather,J.R.(1974): Climatology: Fundamentals and Applications; Mc Craw Hill Book Co.,USA.

Semester – VII: Paper – III

Advanced Oceanography

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester-VII	BECC701	Core Paper	**Advanced Oceanography**	4

Course Learning Outcomes

On completion of this course, learners will be able to:

- Understand the dynamics of ocean physiography and water movement.
- It will help them understand the relevance of oceans as a resource in times to come.

Unit	Topics	No. of Lectures	Credit
Unit – I	Definition and Scope of Oceanography; Plate Tectonics and Origin of Oceans; Relief Features of Ocean Bottom with Special Reference to The Indian Ocean	15	1
Unit – II	Chemical Composition of Ocean Water; Temperature and Density of Ocean; Salinity; Circulation of Oceanic Water (Waves and Tides, Ocean Currents), El Nino and La Nina; Ocean Deposits	15	1
Unit – III	Oceans as an Ecosystems; Energy Flow: Food Chains and Food Webs; Coastal Processes; Mangroves and Estuarine Ecology; Coral Reefs: Formation, Distribution, Importance and Bleaching	15	1
Unit – IV	Classification of Oceanic Resources; Mineral, Energy, and Food Resources; Marine Pollution, Ocean Acidification and Ocean Conservation; Marine Research & Conservation in India	15	1

Suggested Readings

1. Garrison, T. (1993): Oceanography – An Invitation to Marine Science, Wadsworth
2. Gerald, S. (1985): General Oceanography: An Introduction, New York.
3. Gross, G. M. (1990): Oceanography, Macmillan Publication, New York
4. Joseph, W. S. and Parish, H. I. (1974): Introductory Oceanography, McGraw Hill, Tokyo
5. King, C.A. (1986); Oceanography, C.E. Arnold, London.
6. Lal, D.S. (2003): Oceanography, Sharda Pustak Bhawan, Allahabad.
7. Murrey, A.F. (1980): Applied Oceanography, Longman, London and New Jersey
8. Pinet, P. R. (2009): Invitation to Oceanography, Jones and Bartlett Publishers, Boston Publication Co., California
9. Sharma, R.C. &Vatal, Mira (1995): Oceanography for Geographers, Chaitanya Pub. House, Allahabad.
10. Singh, Savindra (2007): Oceanography, Prayag Pustak Bhawan, Allahabad.
11. Stowe, K. S. (1979): Ocean Science, John Wiley and Sons, New York
12. Thurman, H. V. and Trujillo, A. P. (1997): Introductory Oceanography, Prentice Hall,
13. Thurman, H.B. (1983): Introductory Oceanography, Longman, London.
14. Upadhyay, D.P. & Singh, R. (2001): Oceanography (Hindi), Vasundhara Prakashan, Gorakhpur.

Semester – VII: Paper – IV

Research Methodology

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester-VII	BECC701	Core Paper	**Research Methodology**	4

Course Learning Outcomes

On completion of this course, learners will be able to:

- ❖ Learn Basic concept of research and their significance

Unit	Topics	No. of Lectures	Credit
Unit – I	Research Methodology: Definition and Types of Research; Research in Geography; Steps in Research and Research Design; Limitation of Research	15	1
Unit – II	Identification of Problem, Specification of Objectives, Review of Literature, Formulation of Hypotheses; Preparing Research Design	15	1
Unit – III	Sources of Data in Geographical Research: Secondary Data: Census, NSS, CSO, Primary Data: Observational Method, Sampling Methods, and Determining Sample Design; Questionnaires and Interviews; Case Study Method	15	1
Unit – IV	Analysis of Data; Testing of Hypotheses, Generalization and Interpretation; Preparing a Research Report, Format for Scientific Report Writing; Importance of Mapping Techniques in Geographical Research; Citation, Footnoting and Endnoting, Referencing Style and Bibliography; Ethical Consideration in Research	15	1

Suggested Readings:

1. Mishra R.P. (1989) Research Methodology, Concept Publishing Co. New Delhi.
2. Kothari, C.R. (1988) Research Methodology: Methods & Techniques, Wilely Eastern Ltd., New Delhi.
3. Mishra, H.N. & Singh, V.P. (2002) Research Methodology in Geography, Rawat Pub. Jaipur.
4. Bose, P.K. (1994) : Research Methodology: A Trend Report, ICSSR, New Delhi.
5. Stoddart, R.H. (1982) Field, Techniques and Research Methodology in Geography, Kendal Hunt, Dubugue.
6. Chandran, P.R. (1971) Training in Research Methodology in Social Sciences in India, ICSSR, New Delhi.
7. Robert, W.P. (1971) Geographical Research and Writing, New Crowell &Co.
8. Agnihotri, Vidyadhar (1980) Techniques of Social Research, MN Publications, New Delhi.
9. Bajpai, S.R. (2005) Methods of Social Survey and Research, Kitabghar, Kanpur.
10. Sharma, K.R. (2004) Research Methodology, National Publishing House, Jaipur.
11. Harvey, David (1987) Explanations in Geography, New York, Adward Arnold.

Semester – VII: Paper – V

Practical

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester-VII	BECP701	Core Paper	**Practical**	2

Unit	Topics	No. of Lectures	Credit
Unit – I	Introduction of Cartography; Maps and their Types; Source of Geographical Data; Types: Primary and Secondary Data; Cartographic Techniques and Methods in Preparation of Diagrams and Maps; Principles of Map Design; Geological Maps: Bed and Bedding Plane, Rock Outcrop, Dip and Strike; Construction of Geological Cross-Sections;	30	1
Unit – II	Photogrammetry and Aerial Photography: Aerial Photo Interpretation, Elements and Development of Aerial Photography, Determination of Scale of Photographs; Flight Planning; Calculation of Number of Runs & Photo for a given area	--	1

Suggested Readings:

1. Monkhouse, F. J. and Wilkinson, F.J. (1985): Maps and Diagrams. Methuen, London
2. Raisz, E. (1962): General Cartography. John Wiley and Sons, New York. 5th edition.
3. Sarkar, A. K. (1997): Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
4. Sharma, J. P. (2001): Prayogik Bhugol., Rastogi Publication, Meerut 3rd. edition.
5. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions). Kalyani Publishers, New Delhi,.
6. Singh, L.R. (2006): Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.

Year – 4; Semester – VIII	B.A. (Hons.)

Semester – VIII: Paper – I

Modern Geographical Thought

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester-VIII	BECC701	Core Paper	**Modern Geographical Thought**	4

Course outcomes:

Students will be able to understand

- Thorough knowledge of the growth, development, philosophical influences, and relevance of
- Geography from 1970 to the present time.
- Knowledge of emerging areas and new theorizations within the discipline
- An appreciation of the discipline's dynamic and inclusive nature

Unit	Topics	No. of Lectures	Credit
Unit – I	Thomas Kuhn's Concept of Paradigms; Paradigms in Geography; Concepts of Space, Place, Time, and Spatial Organization; Areal Differentiation and Spatial Organization in Geography; The Hartshorne-Schaefer Debate	15	1
Unit – II	Positivism in Geography, Quantitative Revolution in Geography; Geography as a General Spatial System Theory; Models in Geography; Nature of Geographical Theories and Laws; Explanations in Geography	15	1
Unit – III	Rise of Behaviouralism in Geography; Existentialism, Phenomenology and Humanistic Geography; Welfare Approach in Geography	15	1
Unit – IV	Radical Concepts, Marxism and Marxist Geography; Structuralism, Realism and Locality Studies; Post-Modernism and Post-Structuralism in Geography; Concept of Gender Geography – Feminism in Geography	15	1

Suggested Readings:

1. Dikshit, R. D. (2003): Geographical Thought. A Critical History of Ideas. Prentice-Hall of India,New Delhi. (in English and Hindi).
2. Getice, A., Getis, J. and Fellman, J. D. (2007): Introduction to Geography. 10th edition. McGraw Hill, New York.
3. Hartshorne, R. (1959): Perspective on the Nature of Geography, John Murray, London
4. Harvey, D. (1969): Explanations in Geography. Arnold, London.

Semester – VIII: Paper – II

Physical Geography of India

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester-VIII	BECC701	Core Paper	**Physical Geography of India**	4

Course outcomes:

Students will be able to understand

- The detailed physical characteristics of India such as Physiographic, drainage, Climate, Soil, and Forest.
- About climate change, problems related to soil and forest and its conservation strategies.

Unit	Topics	No. of Lectures	Credit
Unit – I	Geological Structure of India; Physiographic Divisions of India (Evolution and Structure of Mountains, Plains, Plateaus); Origin of Himalayas	15	1
Unit – II	Evolution of Extra-peninsular Drainage – A Critical Study of Indo-Brahm Theory; System and Pattern of Peninsular Drainage; Differences Between the Himalayan and Peninsular Drainage	15	1
Unit – III	Characteristics of Climate in India; Climatic Regions of India; Agro-Climatic Regions	15	1
Unit – IV	Problems of Soil - Soil Erosion and Conservation; Saline and Alkaline Soils - Their Measures of Reclamation; Problems of Indian Forestry; Forest Development Programs; Marine Resources of India	15	1

Suggested Readings :

1. Khullar, D. R. (2006): India. A Comprehensive Geography. Kalyani Publishers., New Delhi.
2. Krishnan, M. S. (1968): Geology of India and Burma. 4th edition. Higgin Bothams Private. Ltd., Madras.
3. Nag, P. and Gupta S. S. (1992): Geography of India. Concept Publishing. Company, New Delhi.
4. Sharma, T. C. (2003): India: Economic and Commercial Geography. Vikas Publication., New Delhi.
5. Singh, J. (2003): India: A Comprehensive and Systematic Geography. Gyanodaya Prakashan, Gorakhpur.
6. Singh, R. L. (ed.) (1971): India. A Regional Geography. National Geographical Society of India, Varanasi.
7. Tirtha, R. (2002): Geography of India. Rawat Publications., Jaipur and New Delhi.
8. Tiwari, R. C. (2007): Geography of India, Prayag Pustak Bhawan,

Semester – VIII: Paper – III

Socio-economic Geography of India

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester-VIII	BECC701	Core Paper	**Socio-economic Geography of India**	4

Course Learning Outcomes

On completion of this course, learners will be able to:

- Understand the importance of "Ek Bharat Shrestha Bharat"
- Understand the Geographical aspects of the socio-economic condition of India

Unit	Topics	No. of Lectures	Credit
Unit – I	Population: Growth, Distribution, and Population Density; Demographic Attributes: Sex-ratio, Age Structure, Literacy Rate, Workforce, Dependency Ratio, Longevity; Migration (Inter-regional, Intra-regional and International) and Associated Problems; Population Problems and Policies; Health Indicators	15	1
Unit – II	New trends in Indian Agriculture; Dry-land Farming, Organic Farming and Eco-Farming; Precision Agriculture; Conventional and Non-Conventional Energy – Production & Distribution	15	1
Unit – III	Locational Factors of Indian Industries; Iron Steel Industry in India; Industrial Regions of India; Transport (Road, Rail, Air and Water) in India; Place of India in International Trade	15	1
Unit – IV	Five-year Planning in India: Achievements and Limitations; Multi-Level Planning; Planning at National, State, District, Block and Panchayat Level, Regional Planning in India, and Planning Regions in India; Role of NITI Aayog	15	1

Suggested Readings:

1. Gautam, A. (2006): Advanced Geography of India, Sharda Pustak Bhawan, Allahabad
2. Nag, P. and Gupta, S. S. (1992): Geography of India, Concept Publishing Company, New Delhi.
3. Rao, B.P. (2007): Bharat kee Bhaugolik Sameeksha, Vasundhara Prakashan, Gorakhpur.
4. Sharma, T.C. and Coutinho, O. (2003): Economic and Commercial Geography of India, Vikas Publishing House Private Ltd. New Delhi.
5. Singh , J. (2003): India: A Comprehensive Systematic Geography. Gyanodaya Prakashan, Gorakhpur
6. Singh, J. (2001): Bharat: Bhougolik Aadhar Avam Ayam, Gyanodaya Prakashan, Gorakhpur.(Hindi)
7. Singh, R.L. (ed.) (1971): India: A Regional Geography. National Geographical Society of

India, Varanasi.
8. Tiwari, R.C. (2007): Geography of India, Prayag Pustak Bhawan, Allahabad.
9. Wadia, D. N. (1959): Geology of India. Mac-Millan and Company, London and student edition, Madras.
10. Khullar, D.R. (2007): India: A Comprehensive Geography, Kalyani Publishers, New Delhi.

Semester – VIII: Paper – IV

Regional Planning

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester-VIII	BECC701	Core Paper	**Regional Planning**	4

Course Learning Outcomes

- To understand the concept of Region and Regional Planning.
- To familiarize the students with Theories and Models for Regional Planning.
- To develop an understanding of regional development and planning in India.

Unit	Topics	No. of Lectures	Credit
Unit – I	Philosophy, Concept, Scope, and Purpose of Regional Planning; Types of Regional planning; Formal, Functional, and Planning Regions	15	1
Unit – II	Theories of Regional Development Albert O. Hirschman, Gunnar Myrdal, John Friedman, Dependency theory of Underdevelopment	15	1
Unit – III	Planning Processes – Sectoral & Temporal Approaches to Regional Planning at Micro, Meso, and Macro Levels; The Concept of Growth Centres, Growth Centre Strategy	15	1
Unit – IV	Regional Planning; Concept of Rural Economy and Core–Periphery Relationship, Planning Regions of India Role of Innovation Diffusion; Significance and Role of Irrigation, Transport, and Communication in Regional Planning	15	1

Suggested Readings:

1. Agyeman, Julian, Robert, D. Bullard and Bob, Evans. (Eds.) (2003). Just Sustainabilities: Development in an Unequal World. London: Earthscan. (Introduction and conclusion.).
2. Anand, Subhash.,(2011). Eco-development: Global Perspectives. New Delhi, India: Research India Press.
3. Misra, R. P., Sundaram, K.V., and Rao, V.L.S. (1974). Regional Development planning in India. Delhi, India: Vikas Publishing House.
4. Singh, M B, () Pradeshik Vikas Niyogan, Tara Book Agency, Varanasi.
5. Peet, R. (1999). Theories of Development. New York, U.S.A.: The Guilford Press.
6. Berry, BJ.L. and Horton, F.F. (1970): Geographic Perspectives on Urban Systems. Prentice Hall, New Jersey. 7. Bhat L.S. (1972): Regional Planning In India, Statistical Publishing Society

8. Blij H. J. De, 1971: Geography: Regions and Concepts, John Wiley and Sons.
9. Kulshetra ,S.K,(2012) : Urban and Regional Planning in India : A hand book for Professional Practioners , Sage Publication , New Delhi
10. Kundu, A. (1992): Urban Development Urban Research in India, Khanna Publ. New Delhi.
11. Misra , R.P, Sundaram K.V, Prakash Rao , V.L.S. (1974): Regional Development Planning in India , Vikas Publication , New Delhi.
12. Misra, R.P (1992): Regional Planning: Concepts , techniques , Policies and Case Studies , Concept , New Delhi
13. Friedmann, J. and Alonso W. (1975). Regional Policy - Readings in Theory and Applications. Massachusetts, USA: MIT Press.

Semester – VIII: Paper – V

Practical

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester-VIII	BECP701	Core Paper	**Practical**	2

Unit	Topics	No. of Lectures	Credit
Unit – I	Statistical Methods: Collection, Processing, and Management of Data; Concept and Methods of Sampling; Test of significance: chi-square test, student's t-test; System Analysis: Measurement of Spatial Pattern and Inequality – Z score, Nearest Neighbour Analysis, Network analysis, Drainage ordering method by Strahler	30	1
Unit – II	How to prepare Field Book, steps and methods for preparing Tour report, Methodology for Research in Field Trip, Various aspects of study in Field Trip, Preparation of Surveying in Field Trip. (30 lectures shall be taken before and during the field trip)	--	1

Suggested Readings:

1. Monkhouse, F. J. and Wilkinson, F.J. (1985): Maps and Diagrams. Methuen, London
5. Singh, L.R. (2006): Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.
6. Sharma, JP. (2008): Prayogatmak Bhugol Ki Rooprekha, Rastogi Publications-Meerut.

Suggested Continuous Evaluation Methods:

The following shall be the guidelines and structure of the Educational Tour;
Geographical Excretion Committee
According to the seniority list, all faculty members shall organize geographical excretion as tour in-charge in rotation.
HOD shall Head the Geographical Excretion Committee. Tour in charge shall act as committee

convener and convene a meeting at the beginning of the session or semester. All other teachers of the department shall be a member of the committee. In addition, the tour in charge shall invite four/Five meritorious students based on the last available examination result to participate in the meeting as committee members.

Committee shall:

1. Review the tour plan.
2. Confirm that all arrangements are made in advance.
3. Listen to the opinion of students and give recommendations to tour in-charge accordingly.
4. Review the academic nature of the tour and evaluate the day-wise tour plan and academic activity as submitted by the Tour in charge.

Structure of the tour party

For 20 or less the 20 students, one Faculty member with one non-teaching staff shall accompany the Tour party. For 21 to 50 students, Two Faculty members with one non-teaching staff shall accompany the Tour party. If students are more than 50, then a separate tour batch shall be constituted.

If female students are also participating in tour and tour in-charge, accompany other faculty member or Non-teaching staff none are female then one female attended (Female faculty member from Geography or any other departments/female non-teaching staff) shall accompany with tour party.

Responsibility for tour in-charge

Tour shall at least 15 days stay at location with inter-regional variation (Out of Ganga Plain).

Tour in-charge shall submit a tentative day-wise activity report in advance to HOD.

Tour in-charge shall coordinate with Institutes/Colleges/ Universities/Research institutes etc. in a location where tour is being planned for the following activities;

1. Interaction of students.
2. Lectures on various local physical and cultural attributes of the area by the experts.
3. Local visit with faculty members having an academic understanding of the area.

Lectures by tour in-charge on physical and human characteristics of area being visited for an educational tour.

Survey with students with at least one instrument like Dumpy Level, Sextant, Theodolite, GPS, etc. Questionnaire survey on various socio-cultural or any other aspects. The questionnaire must be prepared in advance and shared during the Geographical Excretion Committee meeting.

Tour in charge shall collect undertaking from all students, which their guardian shall countersign.

Tour in-charge will prepare a list of students accompanying the tour with their mobile number, address, guardian contact information, and one recent color photo. One copy will also be submitted to the head of the department.

The teacher shall always try to minimize tour expenditure of students by;

1. Use concession train reservations and avoid buses if possible.
2. Making stay arrangements for students in advance in youth hostels/lodges/guest houses etc.
3. Try to visit a few important locations only and avoid unnecessary travel for sightseeing. After the completion of the tour, students shall present learning outcomes and experiences under the supervision of tour in-charge. The

presentation shall be attended by Geographical Excretion committee members and other faculty members, staff, students, etc. In addition, all students shall submit tour reports under the supervision of Tour in-charge for evaluation. Tour report shall portray all activities conducted, and places visited for study.

In case of any incident/injury where one or more than one student can't join tour party in return journey. One teaching/non-teaching staff member shall stay with the student until the student's guardian arrives, or the college does not make alternative arrangements. In case tour in-charge stays, the other teacher/staff member shall act as tour in-charge for the remaining tour period according to seniority.

T.A. DA, and other expenses

The College (the University, in case of Campus) shall meet out the T.A., DA, and other expenses of teachers and attendants as admissible to their cadre as per government rule.

Year – 4; Semester – VII	B.A. (Hons. With Research) / M.A. – I

Semester – VII: Paper – I

Advanced Geomorphology

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester-VII	BECC701	Core Paper	**Advanced Geomorphology**	4

Course outcomes:

Students will be able to understand

- The Earth's geomorphic transition from the beginning to the present day.
- Plate tectonics and related movements.
- Landforms carved by various agents of erosion.

Unit	Topics	No. of Lectures	Credit
Unit – I	Definition and Scope of Geomorphology; Principles of Geomorphology; Concept of Time in Geomorphology: Cyclic, Graded, and Steady state; Concept of Morphogenetic Regions; Concept of Dynamic Equilibrium; Recent Trends in Geomorphology	15	1
Unit – II	Landforms in Humid, Arid, Glacial, and Periglacial Environments; Models of Landscape Development by W.M. Davis, W. Penck, and M. Morisawa; Polycyclic Landforms	15	1
Unit – III	Morphometric Analysis of Relief: Basin Morphometry, Hypsographic Curve, Altimetry Frequency Curve, Histogram and Clinographic Curve; Drainage Morphometry: Strahler's Method of Stream Ordering, Drainage Frequency, Density and Texture	15	1
Unit – IV	Applied Geomorphology – Relevance of Geomorphologic Knowledge to Regional Planning, Road and Dam Engineering Construction, Mining, Urbanization, and Natural Hazards; Human Beings as Geomorphic Agents	15	1

Suggested Readings:

1. Singh, Savindra (2018), *Geomorphology* (Eng./Hindi) Allahabad, India: Prayag Pustak
2. Huggett, R.J. (2007): *Fundamentals of Geomorphology*. New York, U.S.A.: Routledge.
3. Khullar, D.R. (2012). *Physical Geography*. New Delhi. India: Kalyani Publishers.
4. Strahler, A. H. and Strahler, A N. (2001): *Modern Physical Geography* (4/E). New York, U.S.A.: John Wiley and Sons, Inc.
5. Thornbury, W. D. (2004): *Principal of Geomorphology.* New York, U.S.A.: Wiley.
6. Bloom, A. L. (2003). Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, New Delhi, India: Prentice-Hall of India

Semester – VII: Paper – II

Advanced Climatology and Oceanography

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester-VII	BECC701	Core Paper	**Advanced Climatology**	4

Unit	Topics	No. of Lectures	Credit
Unit – I	Climatology and Meteorology, Atmospheric Dynamics – Tri-cellular Meridional Circulation, Concepts of Atmospheric Stability and Instability; Air Masses, Fronts and Cyclogenesis; Theories of Precipitation; Mechanism of Monsoon – Traditional vs. Recent Concepts; Impact of El-Nino and Southern Oscillation (ENSO); Indian Ocean Dipole (IOD); Climatic Classifications – Empirical (by Koppen, Thornthwaite) vs. Genetic (by Strahlar)	15	1
Unit – II	Climate Change – Meaning and Concept; Stress, Exposure, Risk, and Vulnerability Related to Climatic Change; Tropical Cyclones as Climatic Hazards; Applied Climatology: Climate and Natural Vegetation, Climate and Agriculture, Urban Heat Islands; Weather Forecasting and Synoptic Climatology	15	1
Unit – III	Definition and Scope of Oceanography; Plate Tectonics and Origin of Oceans; Relief Features of Ocean Bottom with Special Reference to The Indian Ocean; Chemical Composition of Ocean Water; Temperature, Salinity and Density of Oceans	15	1
Unit – IV	Circulation of Oceanic Water (Waves and Tides, Ocean Currents), El Nino and La Nina; Ocean Deposits; Oceans as an Ecosystems; Mangroves and Estuarine Ecology; Coral Reefs: Formation, Distribution, Importance and Bleaching; Classification of Oceanic Resources; Marine Pollution and Ocean Conservation; Marine Research & Conservation in India	15	1

Suggested Readings

1. Ahrens, C.D. (2012): Essentials of Meteorology: An Invitation to the Atmosphere; Cengage Learning, Boston
2. Ahrens, C.D., Jackson, P.L., Jackson, C.E.J. and Jackson, C.E.O. (2012): Meteorology Today: An Introduction to Weather, Climate and the Environment; Cengage Learning; Boston
3. Barry, R.G. and Chorley, R.J. (2003): Atmosphere, Weather and Climate; Psychology Press, Hove; East Sussex.

4. Chawan S.V. (ed) (2015): Physical Geography, Paper I, Published by Director (I/C), Institute of Distance and Open Learning, University of Mumbai.
5. Critchfield, H.J., (1975): general Climatology, Prentice Hall, New Jersey.
6. Lal D.S. (1997): Climatology; Sharda Pustak Bhavan; Allahabad
7. Lydolph, P.E.(1985): The Climate of the Earth, Rowman Nad Allanheld, Totowa, New Jersey.
8. Mather,J.R.(1974): Climatology: Fundamentals and Applications; Mc Craw Hill Book Co.,USA.
9. Garrison, T. (1993): Oceanography – An Invitation to Marine Science, Wadsworth
10. Gerald, S. (1985): General Oceanography: An Introduction, New York.
11. Gross, G. M. (1990): Oceanography, Macmillan Publication, New York
12. Joseph, W. S. and Parish, H. I. (1974): Introductory Oceanography, McGraw Hill, Tokyo
13. King, C.A. (1986); Oceanography, C.E. Arnold, London.
14. Lal, D.S. (2003): Oceanography, Sharda Pustak Bhawan, Allahabad.
15. Murrey, A.F. (1980): Applied Oceanography, Longman, London and New Jersey
16. Pinet, P. R. (2009): Invitation to Oceanography, Jones and Bartlett Publishers, Boston Publication Co., California
17. Sharma, R.C. & Vatal, Mira (1995): Oceanography for Geographers, Chaitanya Pub. House, Allahabad.

Semester – VII: Paper – III

Research Methodology

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester-VII	BECC701	Core Paper	**Research Methodology**	4

Course Learning Outcomes

On completion of this course, learners will be able to:

- Learn Basic concept of research and their significance

Unit	Topics	No. of Lectures	Credit
Unit – I	Research Methodology: Definition and Types of Research; Research in Geography; Steps in Research and Research Design; Limitation of Research	15	1
Unit – II	Identification of Problem, Specification of Objectives, Review of Literature, Formulation of Hypotheses; Preparing Research Design	15	1
Unit – III	Sources of Data in Geographical Research: Secondary Data: Census, NSS, CSO, Primary Data: Observational Method,	15	1

	Sampling Methods, and Determining Sample Design; Questionnaires and Interviews; Case Study Method		
Unit – IV	Analysis of Data; Testing of Hypotheses, Generalization and Interpretation; Preparing a Research Report, Format for Scientific Report Writing; Importance of Mapping Techniques in Geographical Research; Citation, Footnoting and Endnoting, Referencing Style and Bibliography; Ethical Consideration in Research	15	1

Suggested Readings:

1. Mishra R.P. (1989) Research Methodology, Concept Publishing Co. New Delhi.
2. Kothari, C.R. (1988) Research Methodology: Methods & Techniques, Wilely Eastern Ltd., New Delhi.
3. Mishra, H.N. & Singh, V.P. (2002) Research Methodology in Geography, Rawat Pub. Jaipur.
4. Bose, P.K. (1994) : Research Methodology : A Trend Report, ICSSR, New Delhi.
5. Stoddart, R.H. (1982) Field, Techniques and Research Methodology in Geography, Kendal Hunt, Dubugue.
6. Chandran, P.R. (1971) Training in Research Methodology in Social Sciences in India, ICSSR, New Delhi.
7. Robert, W.P. (1971) Geographical Research and Writing, New Crowell &Co.
8. Agnihotri, Vidyadhar (1980) Techniques of Social Research, MN Publications, New Delhi.
9. Bajpai, S.R. (2005) Methods of Social Survey and Research, Kitabghar, Kanpur.
10. Sharma, K.R. (2004) Research Methodology, National Publishing House, Jaipur.
11. Harvey, David (1987) Explanations in Geography, New York, Adward Arnold.

Semester – VII: Paper – IV

Practical

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester- VI	BECP701	Core Paper	**Practical**	2

Unit	Topics	No. of Lectures	Credit
Unit – I	Introduction of Cartography; Maps and their Types; Source of Geographical Data; Types: Primary and Secondary Data; Cartographic Techniques and Methods in Preparation of Diagrams and Maps; Principles of Map Design; Geological Maps: Bed and Bedding Plane, Rock Outcrop, Dip and Strike; Construction of Geological Cross-Sections;	30	1
Unit – II	Photogrammetry and Aerial Photography: Aerial Photo Interpretation, Elements and Development of Aerial	--	1

	Photography, Determination of Scale of Photographs; Flight Planning; Calculation of Number of Runs & Photo for a given area		

Suggested Readings:

1. Monkhouse, F. J. and Wilkinson, F.J. (1985): Maps and Diagrams. Methuen, London
2. Raisz, E. (1962): General Cartography. John Wiley and Sons, New York. 5th edition.
3. Sarkar, A. K. (1997): Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
4. Sharma, J. P. (2001): Prayogik Bhugol., Rastogi Publication, Meerut 3rd. edition.
5. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions). Kalyani Publishers, New Delhi,.
6. Singh, L.R. (2006): Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.

Year – 4; Semester – VIII	B.A. (Hons. With Research) / M.A. – I

Semester – VIII: Paper – I

Modern Geographical Thought

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester-VIII	BECC701	Core Paper	**Modern Geographical Thought**	4

Course outcomes:

Students will be able to understand

- Thorough knowledge of the growth, development, philosophical influences, and relevance of Geography from 1970 to the present time.
- Knowledge of emerging areas and new theorizations within the discipline
- An appreciation of the discipline's dynamic and inclusive nature

Unit	Topics	No. of Lectures	Credit
Unit – I	Thomas Kuhn's Concept of Paradigms; Paradigms in Geography; Concepts of Space, Place, Time, and Spatial Organization; Areal Differentiation and Spatial Organization in Geography; The Hartshorne-Schaefer Debate	15	1
Unit – II	Positivism in Geography, Quantitative Revolution in Geography; Geography as a General Spatial System Theory; Models in Geography; Nature of Geographical Theories and Laws; Explanations in Geography	15	1
Unit – III	Rise of Behaviouralism in Geography; Existentialism, Phenomenology and Humanistic Geography; Welfare Approach in Geography	15	1
Unit – IV	Radical Concepts, Marxism and Marxist Geography; Structuralism, Realism and Locality Studies; Post-Modernism and Post-Structuralism in Geography; Concept of Gender Geography – Feminism in Geography	15	1

Suggested Readings:

5. Dikshit, R. D. (2003): Geographical Thought. A Critical History of Ideas. Prentice-Hall of India, New Delhi. (in English and Hindi).
6. Getice, A., Getis, J. and Fellman, J. D. (2007): Introduction to Geography. 10th edition. McGraw Hill, New York.
7. Hartshorne, R. (1959): Perspective on the Nature of Geography, John Murray, London
8. Harvey, D. (1969): Explanations in Geography. Arnold, London.

Semester – VIII: Paper – II

Physical Geography of India

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester-VIII	BECC701	Core Paper	**Physical Geography of India**	4

Course outcomes:

Students will be able to understand

- The detailed physical characteristics of India such as Physiographic, drainage, Climate, Soil, and Forest.
- About climate change, problems related to soil and forest and its conservation strategies.

Unit	Topics	No. of Lectures	Credit
Unit – I	Geological Structure of India; Physiographic Divisions of India (Evolution and Structure of Mountains, Plains, Plateaus); Origin of Himalayas	15	1
Unit – II	Evolution of Extra-peninsular Drainage – A Critical Study of Indo-Brahm Theory; System and Pattern of Peninsular Drainage; Differences Between the Himalayan and Peninsular Drainage	15	1
Unit – III	Characteristics of Climate in India; Climatic Regions of India; Agro-Climatic Regions	15	1
Unit – IV	Problems of Soil - Soil Erosion and Conservation; Saline and Alkaline Soils - Their Measures of Reclamation; Problems of Indian Forestry; Forest Development Programs; Marine Resources of India	15	1

Suggested Readings :

9. Khullar, D. R. (2006): India. A Comprehensive Geography. Kalyani Publishers., New Delhi.
10. Krishnan, M. S. (1968): Geology of India and Burma. 4th edition. Higgin Bothams Private. Ltd., Madras.
11. Nag, P. and Gupta S. S. (1992): Geography of India. Concept Publishing. Company, New Delhi.
12. Sharma, T. C. (2003): India: Economic and Commercial Geography. Vikas Publication., New Delhi.
13. Singh, J. (2003): India: A Comprehensive and Systematic Geography. Gyanodaya Prakashan, Gorakhpur.
14. Singh, R. L. (ed.) (1971): India. A Regional Geography. National Geographical Society of India, Varanasi.
15. Tirtha, R. (2002): Geography of India. Rawat Publications., Jaipur and New Delhi.
16. Tiwari, R. C. (2007): Geography of India, Prayag Pustak Bhawan,

Semester – VIII: Paper – III

Socio-economic Geography of India

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester-VIII	BECC701	Core Paper	**Socio-economic Geography of India**	4

Course Learning Outcomes

On completion of this course, learners will be able to:

- Understand the importance of "Ek Bharat Shrestha Bharat"
- Understand the Geographical aspects of the socio-economic condition of India

Unit	Topics	No. of Lectures	Credit
Unit – I	Population: Growth, Distribution, and Population Density; Demographic Attributes: Sex-ratio, Age Structure, Literacy Rate, Workforce, Dependency Ratio, Longevity; Migration (Inter-regional, Intra-regional and International) and Associated Problems; Population Problems and Policies; Health Indicators	15	1
Unit – II	New trends in Indian Agriculture; Dry-land Farming, Organic Farming and Eco-Farming; Precision Agriculture; Conventional and Non-Conventional Energy – Production & Distribution	15	1
Unit – III	Locational Factors of Indian Industries; Iron Steel Industry in India; Industrial Regions of India; Transport (Road, Rail, Air and Water) in India; Place of India in International Trade	15	1
Unit – IV	Five-year Planning in India: Achievements and Limitations; Multi-Level Planning; Planning at National, State, District, Block and Panchayat Level, Regional Planning in India, and Planning Regions in India; Role of NITI Aayog	15	1

Suggested Readings:

11. Gautam, A. (2006): Advanced Geography of India, Sharda Pustak Bhawan, Allahabad
12. Nag, P. and Gupta, S. S. (1992): Geography of India, Concept Publishing Company, New Delhi.
13. Rao, B.P. (2007): Bharat kee Bhaugolik Sameeksha, Vasundhara Prakashan, Gorakhpur.
14. Sharma, T.C. and Coutinho, O. (2003): Economic and Commercial Geography of India, Vikas Publishing House Private Ltd. New Delhi.
15. Singh , J. (2003): India: A Comprehensive Systematic Geography. Gyanodaya Prakashan, Gorakhpur
16. Singh, J. (2001): Bharat: Bhougolik Aadhar Avam Ayam, Gyanodaya Prakashan, Gorakhpur.(Hindi)

17. Singh, R.L. (ed.) (1971): India: A Regional Geography. National Geographical Society of India, Varanasi.
18. Tiwari, R.C. (2007): Geography of India, Prayag Pustak Bhawan, Allahabad.
19. Wadia, D. N. (1959): Geology of India. Mac-Millan and Company, London and student edition, Madras.
20. Khullar, D.R. (2007): India: A Comprehensive Geography, Kalyani Publishers, New Delhi.

Semester – VIII: Paper – IV

Practical

Year	Semester	Course Code	Course Type	Course Title	Credit
4	Semester-VIII	BECP701	Core Paper	**Practical**	2

Unit	Topics	No. of Lectures	Credit
Unit – I	Statistical Methods: Collection, Processing, and Management of Data; Concept and Methods of Sampling; Test of significance: chi-square test, student's t-test; System Analysis: Measurement of Spatial Pattern and Inequality – Z score, Nearest Neighbour Analysis, Network analysis, Drainage ordering method by Strahler	30	1
Unit – II	How to prepare Field Book, steps and methods for preparing Tour report, Methodology for Research in Field Trip, Various aspects of study in Field Trip, Preparation of Surveying in Field Trip. (30 lectures shall be taken before and during the field trip)	--	1

Suggested Readings:

1. Monkhouse, F. J. and Wilkinson, F.J. (1985): Maps and Diagrams. Methuen, London
5. Singh, L.R. (2006): Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.
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Suggested Continuous Evaluation Methods:

The following shall be the guidelines and structure of the Educational tour;
Geographical Excretion Committee
According to the seniority list, all faculty members shall organize geographical excretion as tour in-charge in rotation.
HOD shall head the geographical Excretion Committee. Tour in charge shall act as committee convener and convene a meeting at the beginning of the session or semester. All other teachers of the department shall be a member of the committee. In addition, the tour in charge shall invite four/Five meritorious students based on the last available examination result to participate in the

meeting as committee members.
Committee shall:
5. Review the tour plan.
6. Confirm that all arrangements are made in advance.
7. Listen to the opinion of students and give recommendations to tour in-charge accordingly.
8. Review the academic nature of the tour and evaluate the day-wise tour plan and academic activity as submitted by the Tour in charge.

Structure of the tour party

For 20 or less the 20 students, one Faculty member with one non-teaching staff shall accompany the Tour party. For 21 to 50 students, Two Faculty members with one non-teaching staff shall accompany the Tour party. If students are more than 50, then a separate tour batch shall be constituted.

If female students are also participating in tour and tour in-charge, accompany other faculty member or Non-teaching staff none are female then one female attended (Female faculty member from Geography or any other departments/female non-teaching staff) shall accompany with tour party.

Responsibility for tour in-charge

Tour shall at least 15 days stay at location with inter-regional variation (Out of Ganga Plain).

Tour in-charge shall submit a tentative day-wise activity report in advance to HOD.

Tour in-charge shall coordinate with Institutes/Colleges/ Universities/Research institutes etc. in a location where tours are being planned for the following activities;

4. Interaction of students.
5. Lectures on various local physical and cultural attributes of the area by the experts.
6. Local visit with faculty members having an academic understanding of the area.

Lectures by tour in-charge on physical and human characteristics of area being visited for an educational tour.

Survey with students with at least one instrument like Dumpy Level, Sextant, Theodolite, GPS, etc. Questionnaire survey on various socio-cultural or any other aspects. The questionnaire must be prepared in advance and shared during the Geographical Excretion Committee meeting.

Tour in charge shall collect undertaking from all students, which their guardian shall countersign.

Tour in-charge will prepare a list of students accompanying the tour with their mobile number, address, guardian contact information, and one recent color photo. One copy will also be submitted to the head of the department.

The teacher shall always try to minimize tour expenditure of students by;

4. Use concession train reservations and avoid buses if possible.
5. Making stay arrangements for students in advance in youth hostels/lodges/guest houses etc.
6. Try to visit a few important locations only and avoid unnecessary travel for sightseeing. After the completion of the tour, students shall present learning outcomes and experiences under the supervision of tour in-charge. The presentation shall be attended by Geographical Excretion committee members and other faculty members, staff, students, etc. In addition, all students shall

submit tour reports under the supervision of Tour in-charge for evaluation. Tour report shall portray all activities conducted, and places visited for study.

In case of any incident/injury where one or more than one student can't join tour party in return journey. One teaching/non-teaching staff member shall stay with the student until the student's guardian arrives, or the college does not make alternative arrangements. In case tour in-charge stays, the other teacher/staff member shall act as tour in-charge for the remaining tour period according to seniority.

T.A. DA, and other expenses

The College (the University, in case of Campus) shall meet out the T.A., DA, and other expenses of teachers and attendants as admissible to their cadre as per government rule.

Year – 5; Semester – IX	M. A. (One Year) / M.A. – II

Semester – IX: Paper – I

Population Geography

Year	Semester	Course Code	Course Type	Course Title	Credit
5	Semester – IX	BECC701	Core Paper	**Population Geography**	4

Course Learning Outcomes

On completion of this course, learners will be able to:

● Understand the nature, scope, and development of Population geography.

● Understand the various aspects such as population growth and distribution, population dynamics, and Population resource region.

Unit	Topics	No. of Lectures	Credit
Unit – I	Nature and Scope of Population Geography; Sources of Population Data; Methodological Problems; Recent Developments in Population Geography	15	1
Unit – II	Population Growth and Distribution – Classical and Modern Theories; Concepts of 'Underpopulation', 'Overpopulation' and 'Optimum population'; Population Composition, Demographic Transition Theories	15	1
Unit – III	Population Dynamics – Measurement of Fertility and Mortality; Migration Theories; Gravity Model and, Ravenstein Law of Migration, Lee's theories	15	1
Unit – IV	Population Planning; Population Policies in Under-developed and Developed Countries; Human Development Index, Analysis of Fertility Index	15	1

Suggested Readings:

1. Bhende, A. A. and Kanetkar T. (2003): Principles of Population Studies, Himalaya Publishing House, Mumbai.
2. Bose, A. (ed.) (2001): Population in India's Development, 1947-2000. Vikas Publications, New Delhi.
3. Champion, T. (ed.) (1993): Population Matters. Paul Chapman, London.
4. Chandna, R. C. (2006): Geography of Population. Kalyani Publishers., New Delhi.
5. Clark, J. I. (1972): Population Geography. Pergamon Press, Oxford.

6. Dube, K.K. and Singh, M.B. (1994): *Jansankhya Bhoogol*, Rawat Publications, Jaipur and New Delhi.
7. Pathak, L. P. (ed.) (1998): Population Studies. Rawat Publications., Jaipur and New Delhi.
8. Poston, D. L. and Michael, M. (2005): Handbook of Population, Springer Heidelberg, Germany.
9. Ross, John A. (ed.) (1982): International Encyclopaedia of Population. Free Press, New York.
10. Singh, K.N. and Singh, D.N. (eds.) (1992): Population Growth, Environment and Development. EDSC, Varanasi.
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, Englewood Cliffs,

Semester – IX: Paper – II-A

Resource Geography

Year	Semester	Course Code	Course Type	Course Title	Credit
5	Semester – IX	BECC701	Elect. Paper	**Resource Geography**	4

Course Learning Outcomes

On completion of this course, learners will be able to:

- Visualize different resource-rich and scarce areas in water, forest, marine, mineral, and energy resources.
- Know the values of resource preservation and sustainable resource utilization.

Unit	Topics	No. of Lectures	Credit
Unit – I	Meaning, Purpose and Scope of Resource Geography; Methods and Techniques of Resource Appraisal; Concept of Resource Adequacy and Scarcity; Resource Planning – Purpose and Scope	15	1
Unit – II	Principles of Resource Conservation; Resource Management; Conservation and Planning of Resources: Land, Water, Forest, and Minerals (with Special Reference to India)	15	1
Unit – III	Resource Utilization and Development in Indian Perspectives; Impact of Resource Utilization on the	15	1

	Environment; Environmental Planning and Policy in India; Resource Potentials and Resource Regions; Population Resource Regions		
Unit – IV	Case Study from India – Resource Planning Units and Development Strategies in Special Reference to Damodar Valley Corporation (DVC) and National Capital Region (NCR)	15	1

Suggested Readings:

1.Adam, M.G.(2000a): Kumasi Natural Resources Management, Final Technical Report, Natural Resources Institute, University of Greenwich-UK

2. Holechek, J. L., Cole, R., Fisher, J., and Valdez, R. (2000): Natural Resources: Ecology, Economics and Policy. Prentice-Hall, New Jersey.

3. Mitchell, B. (1979): Geography and Resource Analysis. Longman, London Mitchell, B. (1997): Geography and Environmental Management. Longman, Harlow and London.

4. Mitra, A. (1999): Resource Studies; Shridhar Publications., Calcutta. Prasad, H. et al.(eds.) (2005): Sustainable Management of Water Resources, Tara Book Agency, Varanasi

5. Preston, P. W. (1996): Development Theory: An Introduction. Blackwell Publications, Oxford.

6. Rao, P. K. (2001): Sustainable Development: Economics and Policy. Blackwell Publications., Oxford.

7. Raza, M. (ed.) (1989): Renewable Resources for Regional Development: The Indian and the Soviet Experience. Concept Publishing Company, New Delhi.

8. Rees, J. (1985): Natural Resources: Allocation, Economics and Policy.Methuen and Company Ltd., London.

9. Reid, S. (2000): Global Environmental Outlook. Earthscan, London.

10. Simon, D. and Närman, A. (eds.) (1999): Development Theory and Practice. Longman.

Semester – IX: Paper – II-B

Agricultural Geography

Year	Semester	Course Code	Course Type	Course Title	Credit
5	Semester – IX	BECC701	Core Paper	**Agricultural Geography**	4

Course Learning Outcomes

Upon completion of this course, learners will be able to

- Understand the Meaning, scope, & Development of Agricultural Geography.
- Understand the different Determinants, Land use, and shifting cropping patterns and theories related to agriculture.

Unit	Topics	No. of Lectures	Credit
Unit – I	Meaning and Scope of Agricultural Geography; Origin and Dispersal of Agriculture – Major Agricultural Hearths; Diffusion of Agricultural Innovations	15	1

Unit – II	Determinants of Agriculture – Physical, Economic, Political, Technological, Socio-cultural, Cropping Intensity, Degree of Commercialization, Diversification, Specialization, Efficiency, and Productivity (with Reference to India), Crop Combination Regions – Method of Delimitation by Weaver and Doi	15	1
Unit – III	Von-Thunen's Model and Its Modification – Sinclair's Approach, Whittlesey's Classification of Agricultural Regions; Agricultural Typology, Landuse and Land-capability Classification	15	1
Unit – IV	Industrial Agriculture and Agriculture as an Industry; Agriculture and Environmental Degradation, Agriculture and Food; Nutritional Index; Food Security in India; Problems & Policies of Indian Agriculture	15	1

Suggested Reading;

1. Bansil, B. C. (1975): 'Agricultural Problems of India', Delhi.
2. Bayliss Smith, T.P. (1987) : The Ecology of Agricultural Systems. Cambridge University Press, London .
3. Berry, B.J.L. et. al.(1976) : The Geography of Economic Systems. Prentice Hall, New York.
4. Gregor, H.P.: Geography of Agriculture. Prentice Hall, New York, 1970.
5. Grigg, D. (1984): 'An Introduction to Agricultural Geography', Hutchinson Publication, London 6. Grigg, D.B.(1974) : The Agricultural Systems of the World. Cambridge University Press, New York.
7. M.Shafi,(2006); Agricultural Geography. Dorling Kindersly (India) pvt, ltd, Licensees of Pearson Education in South Asia. New Delhi.
8. Majid Hssain, (2002): Systematic Agricultural Geography Rawat Publication, Jaipur & New Delhi.
9. Morgan W.B. and Norton, R.J.C. (1971): Agricultural Geography. Mathuen, London,
10. Morgan, W. B. and Munton, R. J. C. (1977): 'Agricultural Geography' Methuen, London.
10. Morgan, W.B.(1978): Agriculture in the Third World - A Spatial Analysis. Westview Press, Boulde.
11. Sauer, C. O. (1952): 'Agricultural Origins and Dispersals', American Geographical Journal
12. Sauer, C.O.(1969): Agricultural Origins and Dispersals. M.I.T. Press, Mass, U.S.A.
13. Singh J.(1997): Agricultural Development in South Asia: A Comparative A Study in the Green Revolution Experiences, national Books Organization, New Delhi.
14. Singh, J. and Dhillon, S. S. (2000): 'Agricultural Geography', McGraw Hill, New Delhi.
18. The Hindu (2006): Survey of Indian Agriculture 2006. New Delhi.
19. Wigley, G.(1981), Tropical Agriculture: The Development of Production, 4th edition, Arnold, London Universit

Semester – IX: Paper – II-C

Remote Sensing

Year	Semester	Course Code	Course Type	Course Title	Credit

5	Semester – IX	BECC701	Core Paper	**Remote Sensing**	4

Course Learning Outcomes:

- Upon completion of this course, learners will be able to understand the theoretical aspects and practical implementation of Remote sensing Techniques in geography.

Unit	Topics	No. of Lectures	Credit
Unit – I	Remote Sensing: Meaning, Definition, Significance, and Utility of Remote Sensing in Geography; Advantages and Limitations of Remote Sensing	15	1
Unit – II	Principles of Remote Sensing; EMR: Its Properties, Electromagnetic Spectrum, and Characteristics of Different Wavelength Regions; EMR: Interaction Mechanisms; Atmospheric Interaction and Their Types; Surface Interaction and Their Types; Spectral Signature; Spatial, Spectral, Radiometric, and Temporal Resolutions	15	1
Unit – III	Aerial Photography, its Geometry, Relief Displacement, and Image Formations; Classification of Aerial Photographs and their Utility, Elements of Image Recognition and Aerial Photo Interpretation	15	1
Unit – IV	Types of Sensor: Active and Passive; Types and Characteristics of Remote Sensing Platforms; Geostationary and Polar-orbiting Satellites; Digital Image Processing: Pre-Processing-Radiometric, Geometric and Atmospheric Corrections; Enhancements; Image Classification – Supervised and Unsupervised	15	1

Suggested Readings:

1. Choniyal, D D, (2016) Sudur Samvaden evam Bhogolic Suchna Pranali ke sighant, Sharda Pustak Bhavan, Allahabad.
2. Lillesand, T.M. and Kiefer, R.W. (2000): Remote Sensing and Image Interpretation. 4th edition. John Wiley and Sons, New York
3. Campbell, J.B. (2002): Introduction to Remote Sensing. 5th edition, Taylor and Francis, London
4. Bhatta, B. (2010): Remote Sensing and GIS, Oxford University Press, New Delhi.
5. Nag Prithvish and Kudrat M. (1998): Digital Remote Sensing, Concept Publishing Company, New Delhi Curran, P.J. (1985): Principles of Remote Sensing, Longman, London

Semester – IX: Paper – III-A

Regional Planning

Year	Semester	Course Code	Course Type	Course Title	Credit

5	Semester – IX	BECC701	Core Paper	**Regional Planning**	4

Course Learning Outcomes

- To understand the concept of Region and Regional Planning.
- To familiarize the students with Theories and Models for Regional Planning.
- To develop an understanding of regional development and planning in India.

Unit	Topics	No. of Lectures	Credit
Unit – I	Philosophy, Concept, Scope, and Purpose of Regional Planning. Types of Regional planning, Formal, Functional, and Planning Regions	15	1
Unit – II	Theories of Regional Development Albert O. Hirschman, Gunnar Myrdal, John Friedman, Dependency theory of Underdevelopment	15	1
Unit – III	Planning Processes – Sectoral & Temporal Approaches to Regional Planning at Micro, Meso, and Macro Levels; The Concept of Growth Centres, Growth Centre Strategy	15	1
Unit – IV	Regional Planning; Concept of Rural Economy and Core–Periphery Relationship, Planning Regions of India Role of Innovation Diffusion; Significance and Role of Irrigation and Transport Communication in Regional Planning	15	1

Suggested Readings:

1. Agyeman, Julian, Robert, D. Bullard and Bob,Evans. (Eds.) (2003). Just Sustainabilities: Development in an Unequal World. London: Earthscan. (Introduction and conclusion.).
2. Anand, Subhash.,(2011). Ecodevelopment : Glocal Perspectives. New Delhi, India: Research India Press.
3. Misra, R. P., Sundaram, K.V., and Rao, V.L.S. (1974). Regional Development planning in India. Delhi, India: Vikas Publishing House.
4. Singh, M B, () Pradeshik Vikas Niyogan, Tara Book Agency, Varanasi.
5. Peet, R. (1999). Theories of Development. New York, U.S.A.: The Guilford Press.
6. Berry, BJ.L. and Horton, F.F. (1970): Geographic Perspectives on Urban Systems. Prentice Hall, New Jersey. 7. Bhat L.S. (1972): Regional Planning In India, Statistical Publishing Society
8. Blij H. J. De, 1971: Geography: Regions and Concepts, John Wiley and Sons.
9. Kulshetra ,S.K,(2012) : Urban and Regional Planning in India : A hand book for Professional Practioners , Sage Publication , New Delhi
10. Kundu, A. (1992): Urban Development Urban Research in India, Khanna Publ. New Delhi.
11. Misra , R.P, Sundaram K.V, PrakashRao , V.L.S. (1974): Regional Development Planning in India , Vikas Publication , New Delhi.
12. Misra, R.P (1992): Regional Planning: Concepts , techniques , Policies and Case Studies , Concept , New Delhi
13. Friedmann, J. and Alonso W. (1975). Regional Policy - Readings in Theory and Applications. Massachusetts, USA: MIT Press.

Semester – IX: Paper – III-B

Political Geography

Year	Semester	Course Code	Course Type	Course Title	Credit
5	Semester – IX	BECC701	Core Paper	**Political Geography**	4

Course Learning Outcomes

On completion of this course, learners will be able to:

- To understand the scope and development of the subject matter with the understanding of the various approaches involved
- To develop an understanding of the concepts related to the anatomy of the state based on the current philosophy and established theories.
- To understand the spatial processes involved in the success of federalism and electoral geography.
- To understand the Geopolitical Setting of India concerning the neighbours and its significance in the regional world settings.

Unit	Topics	No. of Lectures	Credit
Unit – I	Nature and Scope of Political Geography, Approaches to the Study of Political Geography with Special Reference to German, British and American Schools	15	1
Unit – II	The State and Nation; Anatomy of States: Care Areas and Capitals, Buffer zone, Frontiers and Boundaries; Functions and Classifications, Functional and Unified field Theory Approaches	15	1
Unit – III	Global Strategic Views with Particular Emphasis on Ideas of Mahan, Mackinder, Spykman, Elements of Electoral Geography, Contemporary International Problems, and Problematic Areas	15	1
Unit – IV	The Geopolitical Setting of India, Origin, and Success of Federalism in India in view of its Politico-Administrative Structure India-Pakistan Indo–China Boarder Dispute	15	1

Suggested Readings:

1. Adhikari, S. (2005): Political Geography of India, Sharada Pustak Bhawan, Allahabad
2. Busteed, M.A. (1980): Developments in Political Geography, London.
3. Carlson, L. (1971): Geography and World Politics, Prentice Hall, New Jersey.
4. Chauhan, P.R. (1996): Rajnitik Bhoogol, Vasundhara Prakashan, Gorakhpur.
5. Cox, K. (2002): Political Geography: Territory, State and Society, Wiley-Blackwell
6. Dikshit, R.D. (1989): Political Geography: A Contemporary Perspective, Tata Mc Graw Hill, New Delhi.
7. Dikshit, S.K. (2007): Rajnitik Bhoogol Avam Bhurajniti, Vishwavidyalaya Prakashan, Varanasi.
8. Dwivedi, R.L. (1980): Political Geography, Chaitanya Publishing House, Allahabad.
9. Glassner, M.L. &Blij, H.J.de (1968): Systematic Political Geography, John Wiley, New York.
12. John, R. S. (2002): An introduction to Political Geography, Taylor & Francis.
10. Johnston, R.J. (1982): Geography and the State, Mac Millan, London.

Semester – IX: Paper – III-C

Geographical Information System

Year	Semester	Course Code	Course Type	Course Title	Credit
5	Semester – IX	BECC701	Core Paper	**Agricultural Geography**	4

Course Learning Outcomes

- To understand the concept of Geographical Information systems and their application in geographical studies.
- To familiarize the students with Current Issues and Recent Trends in GIS and Data Handling in GIS.
- To develop an understanding of spatial data analysis, Network analysis, and DEM applications in Geographical studies.

Unit	Topics	No. of Lectures	Credit
Unit – I	Definitions, Development, and Objectives of GIS; Component of GIS; Functional Elements of GIS-data Inquisition; Pre-Processing, Data Management, Product Generation	15	1
Unit – II	Current Issues and Recent Trends in GIS; Computer Fundamentals for GIS – Hardware & Software; Spatial & Non-Spatial Data; Data Structure – Raster & Vector; Concept of Data Base; Database Structures – Hierarchical, Network, Relational, DBMS, RDBMS	15	1
Unit – III	Data Handling in GIS – Data Source, Georeferencing, Data Input-Verification, and Editing, Errors in GIS, Spatial Data Analysis – Raster – Vector-Based, Network Analysis, DEM & its application.	15	1
Unit – IV	Concept and Application of Remote Sensing and GPS in GIS, GIS; Application in Planning & Disaster Management	15	1

Suggested Readings:

1. Bhatia, J.B. (2008) Remote Sensing & GIS, Oxford.
2. Bonham, Carter G.F. (1995): Information Systems for Geoscientists – Modelling with GIS. Pergamon, Oxford. 3. Bruce E. Davis (1996) GIS: A Visual Approach, Onward Press.
4. Burrough, P.A. (1986) Principles of GIS for Land Resource Assessment, Oxford.
5. Burrough, P.A. and McDonnell, R. (1998): Principles of Geographic Information Systems. Oxford University Press, Oxford. London
6. Chang, K.T. (2003): Introduction to Geographic Information Systems. Tata McGraw Hill Publications Company, New Delhi.
7. Chauniyal, D. D. (2004): Remote Sensing and Geographic Information Systems. (in Hindi). Sharda Pustak Bhawan, Allahabad.
8. ESRI (1993): Understanding GIS. Redlands, USA.
9. Fraser Taylor, D.R. (1991): Geographic Information Systems. Pergamon Press, Oxford. 39
10. George, J. (2003): Fundamentals of Remote Sensing. Universities Press Private Ltd, Hyderabad.
11. Girard, M. C. and Girard, C. M. (2003): Processing of Remote Sensing Data. Oxford and IBH,

New Delhi.
12. Goodchild, M.F.; Park, B. O. and Steyaert, L. T. (eds.) (1993): Environmental Modelling with GIS. Oxford University Press, Oxford.

Semester – IX: Paper – IV

Practical

Year	Semester	Course Code	Course Type	Course Title	Credit
5	Semester – IX	BECP701	Core Paper	**Practical**	2

Course outcomes:

Students will be able to understand

 The basic surveying instruments and its implementation in surveying, plotting, levelling, contouring and map making

Unit	Topics	No. of Lectures	Credit
Unit – I	Surveying: Definition, Nature, Scope, types of Surveying, selected Surveying Instruments: Surveying and plotting Plane Table - Resection: two and three-point problems, Surveying and Plotting of a given area by Telescopic Alidade Prismatic compass- Surveying and Plotting by intersection and transverse method	30	1
Unit – II	Sextant: - Angle, Distance and Height Measurement Profile Levelling by Dumpy Level Measurement of Horizontal and Vertical Angle by Theodolite	30	1

Suggested Readings:

1.Monkhouse, F. J. and Wilkinson, F.J. (1985): Maps and Diagrams. Methuen, London
2. Raisz, E. (1962): General Cartography. John Wiley and Sons, New York. 5th edition.
3. Sarkar, A. K. (1997): Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
4. Sharma, J. P. (2001): Prayogik Bhugol., Rastogi Publication, Meerut 3rd. edition.
5. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions). Kalyani Publishers, New Delhi.
6. Singh, L.R. (2006): Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.

Year – 5; Semester – X | **M. A. (One Year) / M.A. – II**

Semester – X: Paper – I

Statistical Methods in Geography

Year	Semester	Course Code	Course Type	Course Title	Credit
5	Semester- X	BECC701	Core Paper	**Statistical Methods in Geography**	4

Course Learning Outcomes

Upon completion of this course, learners will be able to

- Understand and use to describe and explain various geographical patterns and relationships.
- Based on the nature of the data and purpose of study, students would be able to make a rational choice between parametric and non-parametric statistical methods in their research projects.

Students shall be allowed analog calculator only

Unit	Topics	No. of Lectures	Credit
Unit – I	Statistics, Geography and Statistics, Significance of Statistics in Geographical Studies, Primary and Secondary Data, Levels of Data Measurement: Nominal, Ordinal, Interval, and Ratio	15	1
Unit – II	Measures of Central Tendency: Mean, Median, Mode, and Their Geographical Significance, Standard Distance	15	1
Unit – III	Measures of Dispersion and Concentration: Mean Deviation, Standard Deviation; Coefficient of Variation, Lorenz Curve and Gini's Coefficient; Location Quotient	15	1
Unit – IV	Correlation and Regression: Scatter diagram, Correlation by Spearman's Rank Difference and Karl Pearson's Product Moment, Significance Testing of Correlation	15	1

Suggested Reading;

1. Bansil, B. C. (1975): 'Agricultural Problems of India', Delhi.
2. Bayliss Smith, T.P. (1987) : The Ecology of Agricultural Systems. Cambridge University Press, London .
3. Berry, B.J.L. et. al.(1976) : The Geography of Economic Systems. Prentice Hall, New York.
4. Gregor, H.P.: Geography of Agriculture. Prentice Hall, New York, 1970.
5. Grigg, D. (1984): 'An Introduction to Agricultural Geography', Hutchinson Publication, London 6. Grigg, D.B.(1974) : The Agricultural Systems of the World. Cambridge University Press, New York.
7. M. Shafi,(2006); Agricultural Geography. Dorling Kindersly (India) pvt, ltd, Licensees of Pearson Education in South Asia. New Delhi.
8. Majid Hussain, (2002): Systematic Agricultural Geography Rawat Publication, Jaipur & New Delhi.
9. Morgan W.B. and Norton, R.J.C. (1971): Agricultural Geography. Mathuen, London,
10. Morgan, W. B. and Munton, R. J. C. (1977): 'Agricultural Geography' Methuen, London.
10. Morgan, W.B.(1978): Agriculture in the Third World - A Spatial Analysis. Westview Press, Boulde.

11. Sauer, C. O. (1952): 'Agricultural Origins and Dispersals', American Geographical Journal
12. Sauer, C.O.(1969): Agricultural Origins and Dispersals. M.I.T. Press, Mass, U.S.A.
13. Singh J.(1997): Agricultural Development in South Asia: A Comparative A Study in the Green Revolution Experiences, national Books Organization, New Delhi.
14. Singh, J. and Dhillon, S. S. (2000): 'Agricultural Geography', McGraw Hill, New Delhi.
18. The Hindu (2006): Survey of Indian Agriculture 2006. New Delhi.
19. Wigley, G.(1981), Tropical Agriculture: The Development of Production, 4th edition, Arnold, London University

Semester – X: Paper – II-A

Geography of Rural Development

Year	Semester	Course Code	Course Type	Course Title	Credit
5	Semester- X	BECC701	Core Paper	**Geography of Rural Development**	4

Course Learning Outcomes

On completion of this course, learners will be able to:

- Visualize different Types and Patterns of Rural Settlement.
- Understand Planning of Rural Settlement.

Unit	Topics	No. of Lectures	Credit
Unit – I	Nature, Scope, Significance and Development of Rural Settlement; Approaches to Settlement	15	1
Unit – II	Types and Pattern of Rural Settlement; Histrogenesis, Spatio-temporal Dimensions, and Morphogenesis of Rural Settlement; Site, Shape, Size, and Spacing of Rural Settlement	15	1
Unit – III	Geography Morphology and Functions; Cause of Rural-Urban Nexus; Spatial Relation of an Indian Rural Settlement	15	1
Unit – IV	Rural House Type; Rural Service Centres and Planning of Rural Settlement	15	1

Suggested Readings:

1.Adam, M.G.(2000a): Kumasi Natural Resources Management, Final Technical Report, Natural Resources Institute, University of Greenwich-UK
2. Holechek, J. L., Cole, R., Fisher, J., and Valdez, R. (2000): Natural Resources: Ecology, Economics and Policy. Prentice-Hall, New Jersey.
3. Mitchell, B. (1979): Geography and Resource Analysis. Longman, London Mitchell, B. (1997): Geography and Environmental Management. Longman, Harlow and London.
4. Mitra, A. (1999): Resource Studies; Shridhar Publications., Calcutta. Prasad, H. et al.(eds.) (2005): Sustainable Management of Water Resources, Tara Book Agency, Varanasi
5. Preston, P. W. (1996): Development Theory: An Introduction. Blackwell Publications, Oxford.

6. Rao, P. K. (2001): Sustainable Development: Economics and Policy. Blackwell Publications., Oxford.
7. Raza, M. (ed.) (1989): Renewable Resources for Regional Development: The Indian and the Soviet Experience. Concept Publishing Company, New Delhi.
8. Rees, J. (1985): Natural Resources: Allocation, Economics and Policy.Methuen and Company Ltd., London.
9. Reid, S. (2000): Global Environmental Outlook. Earthscan, London.
10. Simon, D. and Närman, A. (eds.) (1999): Development Theory and Practice. Longman.
11. Simon, D. (ed.) (2005): Fifty Key Thinkers on Development. Routledge, London.
12. Singh, M. B. et. al. (eds.) (2005): Sustainable Management of Natural Resources. Tara Book Agency, Varanasi.

Semester – X: Paper – II-B

Industrial Geography

Year	Semester	Course Code	Course Type	Course Title	Credit
5	Semester- X	BECC701	Core Paper	**Industrial Geography**	4

Course Learning Outcomes

- To know the scope and advancement of industrial Geography as an established branch of the Geography as a subject.
- To build the theoretical understanding based on certain models related to the processes of the industrial location.
- Identify spatial patterns of industrialization, globalization, and industrial development

Unit	Topics	No. of Lectures	Credit
Unit – I	Definition and Scope of Industrial Geography; Recent Trends in Industrial Geography; Industrial Location Factors; Linkage in Industries	15	1
Unit – II	Industrial Location Theories – A. Weber, I. M. Hoover, A. Losch and W. Isard; Criteria for Identification of Industrial Regions; Industrial Regions of USA, Japan, U.K. and West Europe	15	1
Unit – III	Industrialization in India – Industrial Development and Policies, Industrial Regions and Complexes; Impact of Globalization and Problems of Industrialization; Environmental Impact of Industrialization	15	1
Unit – IV	Tourism as an Industry; Elements of Tourism; Tourism in Uttaranchal and Eastern UP	15	1

Suggested Readings:

1. Alexanderson, C. (1967): Geography of Manufacturing, Prentice Hall, India.
2. Chaudhary, M.R (1970): Indian Industries – Development & Location, Oxford & IBH Company.
3. Kuchhal, S.C. (1997): Industrial Economics of India, Chaitanya Publication, Allahabad.

4. Kumar, Pramila & Sharma, S.K. (1985): Industrial Geography (Hindi), M.P.Hindi Granth Academy, Bhopal.
5. Miller, A. (1962): Geography of Manufacturing, Prentice Hall, New Jersey. Publishing Co. Ltd., New Delhi
6. Seth, V.K. (1987) Industrialization in India: Spatial Perspective, Delhi Commonwealth Publication.
7. Sharma, V.N. (2001): Spatial Pattern of Industrial Development in M.P., Radha Publication, New Delhi.
8. Singh, J. and Dhillon, S. S. (1994): Agricultural Geography, Tata McGraw Hill
9. Sinha, B.N. (1987): Industrial Geography of India, Oxford Book House, New Delhi.
10. Smith, D.M.(1982) Industrial Location : An Economic Geographic Analysis, John Wiley & Sons, New York. 11. Symons, L. (1970): Agricultural Geography, G. Bell and Sons Ltd., London
12. Vaidya, B. C. (1997): Agricultural Land use in India, Manak Publications, New Delhi 13. Weber, Alfred (1957): Theory of Location of Industries, Chicago University Press.

Semester – X: Paper – II-C

Marketing Geography

Year	Semester	Course Code	Course Type	Course Title	Credit
5	Semester-VIII	BECC701	Core Paper	**Marketing Geography**	4

Course Learning Outcomes

On completion of this course, learners will be able to:

- The paper introduces the meaning and scope of marketing geography and spatial organization of markets.
- Explain market cycles and development of markets, importance in rural development.
- Students can identify and Analyse the impact of Globalization on Marketing, Social Structure and Marketing, Marketing, and Innovation Diffusion.

Unit	Topics	No. of Lectures	Credit
Unit – I	Definition, Scope, and Evolution of Marketing Geography, Spatial Organization of Markets; Typology of Markets Periodic & Regulated Markets, Urban & Rural Markets	15	1
Unit – II	Hierarchy of Markets and their Role in Economic Development. Spatiotemporal Characteristics of Markets Market Cycles, Development of Marketing System, Market Area Region	15	1
Unit – III	Vertical and Horizontal Relations of a Market. Marketing and Rural Development Role of Marketing in Rural Development, Christaller's Central Place Theory, Market as a Service Centre	15	1
Unit – IV	Impact of Globalization on Marketing, Social Structure, and Marketing. Marketing and Innovation Diffusion	15	1

Suggested Readings:

1. Garnier, J. Beaujau & Delobez, A. (1979): Geography of Marketing, Longman, London.
2. Shrivastava, V.K. & Dixit, R.S. (1995): VipranBhoogol, Madhya Pradesh Hindi Granth Academy, Bhopal.
3. Bromley, R.J. (1979): Periodic Markets, Daily Markets and Fares : A Bibliography, Monash Pub.
4. Davies, R.L.,(1977): Marketing Geography with Special Reference to Retailing Methun, London
5. Shrivastava, V.K. (1987): Geography of Marketing and Rural Development, Inter India Pub. New Delhi.
6. Saxena, H.M. (1984): Marketing Geography, Starling Publication, New Delhi.
7. Saxena, H.M. (1975): Geography of Transport & Marketing, S. Chand & Com., New Delhi.
8. Saxena, H.M. (1988): Rural Markets and Development, Rawat Publications, Jaipur.
9. Shrivastava, V.K. & Chauhan, P.R. (2001): Marketing of Agricultural Produce & Rural Development, Vasundhara Prakashan, Gorakhpur.
10. Shrivastava, Hari Om (1992): VipranBhoogol, Vasundhara Prakashan, Gorakhpur.
11. Berry, B.J.L. (1967): Geography of Market Centres and Retail Distribution, Prentis Hall, Englewood Cliff.
12. Alvater, E. (1992): The Future of the Markets, Verso, London.
13. Dixit, R.S. (2004): Agricultural Marketing in India, Shubhi Publications, Gurgaon.

Semester – X: Paper – III-A

Urban Geography

Year	Semester	Course Code	Course Type	Course Title	Credit
5	Semester-VIII	BECC701	Core Paper	**Urban Geography**	4

Course Learning Outcomes

- To know the scope and advancement of the Urban Geography as an established branch of the Geography as a subject
- To understand the spatial processes of urban growth and factors which affect the origin and development of urban settlements.
- To build the theoretical understanding based on certain models related to the processes of urban morphology.
- To understand the theoretical and functional classification of the urban settlements and the related socio-economic problems and planning issues.

Unit	Topics	No. of Lectures	Credit
Unit – I	Meaning, Scope, and Development of Urban Geography; Factors of Urban Growth – Ancient, Medieval, and Modern Period; Origin and Location of Modern Urban Settlement	15	1
Unit – II	The Models of Urban Growth – Concentric Zone, Sectoral and Multiple-nuclei; Conurbations and Megalopolis; Urban Umland and Urban Fringe; Functional Classification of Urban Centres; Urban Hierarchy and Rank Size Relationship; Morphology of Urban Settlement	15	1

Unit – III	Indian Urban Scenario – Demographic Structure and Characteristics of Urban Population, Trend of Urbanization, Occupational Pattern, Urban Amenities, Urban Land Use, Urban Problems, Urban Planning	15	1
Unit – IV	Town Planning in India; Smart Cities; The Role of Geographer in Town Planning; Special Study of KAVAL Towns of UP – Residential Problems, Morphological, and Functional Characteristics	15	1

Suggested Readings:

1. Alam, S.M. (1965) Hyderabad-Secundrabad : A Study in Urban Geography, Allied Publishers, Mumbai.
2. Bansal, S.C. (2008) Urban Geography (in Hindi), Meenakshi Prakashan, Meerut.
3. Bose, A. (1980): India's Urbanisation, Tata McGraw Hill, New Delhi.
4. Carter, H. (1979): The Study of Urban Geography, Arnold Heinemann, London. 42
5. Gibbs, J. P. (Ed.),(1961): Urban Research Methods, Princeton.
6. Hall, T. (2006): Urban Geography, Routledge, London.
7. Karan, M.P. (1991) Urban Geography (in Hindi), Kitab Ghar Acharya Nagar, Kanpur.
8. Mandal, R.B. (2000) Urban Geography: A Textbook, Concept Publishing Company, New Delhi.
9. Mayer, H.M. & Kohn, C.F. (1967): Reading in Urban Geography, Central Book Depot, Allahabad.
10. Pacione, M. (2009): Urban Geography, Routledge, New York Press, New Delhi.
11. Ramchandran, R. (1997): Urbanization and Urban Systems in India, Oxford University.

Semester – X: Paper – III-B

Transport Geography

Year	Semester	Course Code	Course Type	Course Title	Credit
5	Semester-VIII	BECC701	Core Paper	**Transport Geography**	4

Course Learning Outcomes

- To know the scope and advancement of the Transport Geography from ages as an established branch of the Geography as a subject
- Students shall learn about the significance of transport in multifaceted development, various models and theories related to transport networks, accessibility and connectivity, and policy intervention
- To understand the transport system in India concerning Uttar Pradesh and the concept of Transport Planning.

Unit	Topics	No. of Lectures	Credit
Unit – I	Definition and Scope of Transport Geography; Evolution of Transportation – Pre Industrial Era, Ninetieth Century, Twentieth Century; Characteristic and Relate Significance of Different Means of Transport	15	1

Unit – II	Evolution of Transport Network Model with special Reference to Taaffee, Morrill, and Gould; Structure of Transport Network	15	1
Unit – III	Concept of Accessibility and Locational Utility; Bases of Spatial Interaction – Complementarity, Intervening Opportunity; Transferability; Concept of Gravity Potential Model and Spatial Interaction; Theories Related to Freight Determination	15	1
Unit – IV	Transport System in India and Uttar Pradesh (i) Rail (ii) Road (iii) Waterway (iv) Air Transport; Major Transport Routes of the World; Concept of Accessibility; Transport and Regional Development Transport Planning	15	1

Suggested Readings:

1. Bamford, C.G. and Robinson, H. (1978), Geography of Transport, Macdonald and Evans, London.
2. Bhaduri S. (1992), Transport and Regional Development, Concept Publishing Company, New Delhi.
3. Eliot Hurst, ME (1972), A Geography of Economic Behaviour: An Introduction, Duxbury Press, California.
4. Hammond, R. and Mc Cullagh, P.S. (1989), Quantitative Techniques in Geography; An Introduction, Clarendon Press, Oxford.
5. Hoyle, Band and Knowles, R. (2000), Modern Transport Geography, John Wiley and Sons, New York.
6. Mangat, H.S. and Gill, Lakhvir Singh. (2015), Haryana: Levels of Road Transportation, Punjab Geographer, Vol. 11, October, Punchkula, pp.87-102.
7. Raza, M. and Aggarwal, Y.P. (1985), Transport Geography of India, Concept Publishing Company, New Delhi. 8. Saxena, H.M. (2010), Transport Geography, Rawat Publications, New Delhi.
9. Subodh Rani and Chamar, K.V. (2016), Levels of Road Connectivity in Haryana, Punjab Geographer, Vol. 12, October, Punchkula.
10.Taaffe, E.J. and Gauthier, H.L. (1973) Geography of Transportation, Prentice Hall Englewood Cliff, New Jersey.
11. Vaidya, B.C. (1998), Reading's in Transport Geography, Devika Publications, Delhi.

Semester – X: Paper – III-C

Geography of Health

Year	Semester	Course Code	Course Type	Course Title	Credit
5	Semester-VIII	BECC701	Core Paper	**Geography of Health**	4

Course Learning Outcomes

- To know the scope and advancement of the Geography of health as an established branch of the Geography as a subject.
- To understand the Classification of Diseases, their pattern, and distribution globally.
- To build the theoretical understanding based on certain models related to the processes of the Health Geography.

❖ To understand the role of Health Care organizations of the world in disease eradication and health for all.

Unit	Topics	No. of Lectures	Credit
Unit – I	Meaning, Scope, Significance, Development, Methods, and Techniques of Geography of Health; Geographical Factors Affecting Human Health & Diseases – Physical, Social, Economic and Environmental; Ecology	15	1
Unit – II	Vital & Health India Ces; Classification of Diseases Genetic, Communicable & Non-communicable Occupational and Deficiency Diseases; Geography of Hunger and Malnutrition; Pattern of Distribution of Major Diseases in the World	15	1
Unit – III	Etiology and Transmission of Major Diseases – Cholera, Malaria, Tuberculosis, Hepatitis, Cancer, AIDS, and STDS and Their Regional Study with Special Reference to India; Disease Diffusion Models and Health Care; Accessibility Models	15	1
Unit – IV	Health Care – International Level – WHO, UNICEF & REDCROSS; National Level – Government and NGOs, Health Planning and Policy in India Family Welfare, Immunization, National Disease Eradication & Health for All	15	1

Suggested Readings:

1. Akhtar Rais (Ed.), 1990: Environment and Health Themes in Medical Geography, Ashish Publishing House, New Delhi.
2. Avon Joan L. and Jonathan A Patzed.2001: Ecosystem Changes and Public Health, Baltimin, John Hopling Unit Press(ed).
3. Bradley,D.,1977: Water, Wastes and Health in Hot Climates, John Wiley Chichesten.
4. Christaler George and Hristopoles Dionissios, 1998: Spatio Temporal Environment Health Modelling , Boston Kluwer Academic Press.
5. Cliff, A.D. and Peter,H., 1988 : Atlas of Disease Distributions, Blackwell Publishers, Oxford.
6. Gatrell, A.,and Loytonen, 1998 : GIS and Health, Taylor and Francis Ltd, London.
7. Hardham T. and Tannav M.,(eds): Urban Health in Developing Countries; Progress, Projects, Earthgoan, London.
8. Murray C. and A. Lopez, 1996 : The Global Burden of Disease, Harvard University Press.

Semester – X: Paper – V

Practical

Year	Semester	Course Code	Course Type	Course Title	Credit
5	Semester-VIII	BECP701	Core Paper	**Practical**	2

Course outcomes:

Students will be able to:

- In-depth theoretical and practical knowledge of Cartograms and Map Projection.
- To understand the shape analysis and gravity model.
- To present data through graphical and diagrammatic formats.
- Learn to prepare Practical Files.

Unit	Topics	No. of Lectures	Credit
Unit – I	Lorenz Curve and Gini Coefficient, Location Quotient, Coefficient of Localization & Localization Curve, Shape Analysis, Gravity Models, Retail Gravitation; Map Projections: Meaning, Classification, and Choice of Projections; Construction and Characterization of Projection – Lambert's Conical, Polyconic, Galls, Mercator's Gnomonic Equatorial Zenithal, Sinusoidal, Mollweide and their interrupted cases, International UTM	30	1
Unit – II	Cartograms - Climatic Diagrams Rainfall Dispersion Diagram; Water Budget; Ergo-graph – Climatic and Circular, Shape Analysis; Thematic Cartograms – Choropleth, Isopleth, Chorochromatic Diagram; Multiple Dot, Traffic Flow, Population Projection by Graphical and logarithm methods, Gravity Models, Retail Gravitation	30	1

Suggested Readings:

1. Raisz, E. (1962): General Cartography. John Wiley and Sons, New York. 5th edition.
2. Sarkar, A. K. (1997): Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
3. Sharma, J. P. (2001): Prayogik Bhugol. Rastogi Publication. Meerut 3rd. edition.
4. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions). Kalyani Publishers, New Delhi.
5. Singh, L.R. (2006): Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.

Board of Studies (BoS)

Undergraduate

Sl. No.	Name of the Members	Name of Institution
1	Dr. Vishal Gupta **(Convenor)**	Siddharth University, Kapilvastu
2	Prof. Anita Singh	A.P.N. P. G. College, Basti
3	Prof. Arvind Kumar Singh	Shivpati P.G. College, Sohratgadh
4	Prof. Pradip Kumar	Shivharsh Kishan PG College, Basti
5	Prof. S. N. Singh	M.L.K.P.G. College, Balrampur
6	Prof. Rekha Vishwakarma	M.L.K.P.G. College, Balrampur
7	Dr. Amar Singh Gautam	H.R.P.G. College, Khalilabad
8	Dr. Brahma Singh	Ratansen P.G. College, Bansi
9	Dr. Satyam Mishra	Siddharth University, Kapilvastu
10	Mr. Vishal Prakash	Shivharsh Kishan PG College, Basti
11	Dr. Khedoo Ram	J.L.N.S.P.G. College, Maharajganj
External Experts		
12	Prof. Siv Shankar Verma	D.D.U. Gorakhpur University, Gorakhpur
13	Prof. R. B. Patel	D.D.U. Gorakhpur University, Gorakhpur
14	Prof. Shrikant Dixshit	D.D.U. Gorakhpur University, Gorakhpur

Post-Graduate

Sl. No.	Name of the Members	Name of Institution
1	Dr. Vishal Gupta (Convenor)	Siddharth University, Kapilvastu
2	Prof. Pradip Kumar	Shivharsh Kishan PG College, Basti
3	Prof. S. N. Singh	M.L.K.P.G. College, Balrampur
4	Prof. Rekha Vishwakarma	M.L.K.P.G. College, Balrampur
5	Dr. Amar Singh Gautam	H.R.P.G. College, Khalilabad
6	Dr. Satyam Mishra	Siddharth University, Kapilvastu
7	Dr. Anuj Singh	M.L.K.P.G. College, Balrampur
8	Dr. Bijay Kumar Singh	Shivharsh Kishan PG College, Basti
External Experts		
9	Prof. Siv Shankar Verma	D.D.U. Gorakhpur University, Gorakhpur
10	Prof. R. B. Patel	D.D.U. Gorakhpur University, Gorakhpur
11	Prof. Shrikant Dixshit	D.D.U. Gorakhpur University, Gorakhpur