गोंय विद्यापीठ
ताळगांव पठार,
गोंय – ४०३ २०६
फोन : +९१-८६६९६०९०४८

(Accredited by NAAC)

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GU/Acad –PG/BoS -NEP/2025-26/186 Date: 27.06.2025

CIRCULAR

The Academic Council & Executive Council of the University has approved Ordinance OA-35A relating to PG Programmes offered at the University campus and its affiliated Colleges based on UGC 'Curriculum and Credit Framework for Postgraduate Programmes'. Accordingly, the University has proposed introduction of Ordinance OA-35A from the Academic year 2025-2026 onwards.

The Programme structure and syllabus of Semester I and II of the **Master of Arts in Geography** Programme approved by the Academic Council in its meeting held on 13th & 14th June 2025 is attached.

The Dean, D.D. Kosambi School of Social Sciences and Behavioural Studies and Principals of affiliated Colleges offering the **Master of Arts in Geography** Programme is requested to take note of the above and bring the contents of the Circular to the notice of all concerned**.**

ASHWIN VYAS LAWANDE
Digitally signed by ASHWIN VYAS LAWANDE
Date: 2025.06.27 16:32:41 +05'30'

(Ashwin V. Lawande)
Deputy Registrar – Academic

To,
1. The Dean, D.D. Kosambi School of Social Sciences and Behavioural Studies, Goa University.
2. The Vice-Dean (Academic), D.D. Kosambi School of Social Sciences and Behavioural Studies, Goa University.
3. The Principals of affiliated Colleges offering the Master of Arts in Geography Programme.

Copy to:
1. Chairperson, BoS in Geography.
2. Programme Director, M.A. Geography, Goa University
3. Controller of Examinations, Goa University.
4. Assistant Registrar Examinations (PG), Goa University.
5. Director, Directorate of Internal Quality Assurance, Goa University for uploading the Syllabus on the University website.

GOA UNIVERSITY

MASTER OF ARTS IN GEOGRAPHY

(Effective from the Academic Year 2025-26)

ABOUT THE PROGRAMME

The MA Geography programme at Government College of Arts, Science and Commerce, Khandola, Goa is a comprehensive and rigorous course that integrates theoretical knowledge with practical application to explore the multifaceted nature of our physical and human landscapes. Designed with a multidisciplinary approach, the programme delves into advanced subjects—from geomorphology and climatology to remote sensing and environmental geography—ensuring that students gain a well-rounded perspective on geographic phenomena.

By engaging with topics that range from the technical aspects of GIS, spatial analysis, and statistical research methods to the deeper socio-political and cultural dimensions of geography, learners are prepared to tackle contemporary environmental challenges and contribute to informed decision-making in both academic and professional arenas.

OBJECTIVES OF THE PROGRAMME

- **Deep Conceptual Understanding:**
  Equip students with robust knowledge of geographical theories, concepts, and models.
- **Applied Analysis:**
  Enable students to apply theoretical frameworks to real-world geographical events.
- **Critical Evaluation:**
  Develop analytic skills to dissect and understand environmental phenomena and their impacts.
- **Sustainable Resource Management:**
  Prepare students to manage, forecast, and safeguard natural resources through informed strategies.

Approved by: Academic Council on 13th & 14th June 2025

PROGRAMME SPECIFIC OUTCOMES (PSO)	
PSO 1.	**Understand** the various concepts, theories and models in different fields of Geography.
PSO 2.	**Infer and apply** the theories, models and concepts to relevant events.
PSO 3.	**Analyse** the theories, models and concepts in order to understand a geographical/environmental/natural event/calamity and its impacts.
PSO 4.	**Develop** an understanding of the earth's phenomena and to safeguard the earth's resources through analysis, application, management strategies and forecasting.

SEMESTER I				
Discipline Specific Core (DSC) Courses (16 credits)				
Sr. No.	**Course Code**	**Title of the Course**	**Credits**	**Level**
1	GOG-5000	Advanced Geomorphology	3T	400
2	GOG-5001	Practicals in Geomorphology	1P	400
3	GOG-5002	Advanced Climatology	3T	400
4	GOG-5003	Practicals in Climatology	1P	400
5	GOG-5004	Fundamentals of Remote Sensing	3T	400
6	GOG-5005	Practicals in Remote Sensing	1P	400
7	GOG-5006	Environmental Geography	4T	400
Total Credits for DSC Courses in Semester I			**16**	
Discipline Specific Elective (DSE) Course (4 credits)				
Sr. No.	**Course Code**	**Title of the Course**	**Credits**	**Level**
1	GOG-5201	Disaster Mitigation and Management	4	400
2	GOG-5202	Geographical Foundations of Ocean Systems	4	400
3	GOG-5203	Soil Geography and Analysis	4	400
4	GOG-5204	Social and Cultural Geography	4	400
Total Credits for DSE Courses in Semester I			**4**	
Total Credits in Semester I			**20**	

SEMESTER II				
Discipline Specific Core (DSC) Courses				
Sr. No.	**Course Code**	**Title of the Course**	**Credits**	**Level**
1	GOG-5007	Population Geography	3T	400
2	GOG-5008	Practicals in Population Geography	1P	400
3	GOG-5009	Economic Geography	3T	400
4	GOG-5010	Practicals in Economic Geography	1P	400
5	GOG-5011	Fundamentals of Geographic Information System	3T	400
6	GOG-5012	Practicals in Geographic Information System	1P	400
7	GOG-5013	Quantitative and Statistical Techniques in Geographic Research	4T	400
Total Credits for DSC Courses in Semester II			**16**	
Discipline Specific Elective (DSE) Courses (4 credits)				
Sr. No.	**Course Code**	**Title of the Course**	**Credits**	**Level**
1	GOG-5205	Political Geography	4	400
2	GOG-5206	Geography of Trade and Transport	4	400
3	GOG-5207	Applied Regional Geography of India and Regional Integration	4	400
4	GOG-5208	Geography of Migration Studies	4	400
Total Credits for DSE Courses in Semester II			**4**	
Total Credits in Semester II			**20**	

Blooms Taxonomy Cognitive Levels	
Cognitive Level	**Notations**
K1	Remembering
K2	Understanding
K3	Applying
K4	Analyzing
K5	Evaluating
K6	Create

SEMESTER I

Discipline Specific Core (DSC) Courses

Title of the Course	Advanced Geomorphology
Course Code	GOG-5000
Number of Credits	3
Theory/Practical	Theory
Level	400
Effective from AY	2025-26
New Course	No
Bridge Course/ Value added Course	No
Course for advanced learners	Yes

Pre-requisites for the Course:	Knowledge of Bachelor's Programme in Geography	
Course Objectives:	The course aims to provide a comprehensive understanding of geomorphological principles, processes, and applications, including the Earth's structure, landform evolution, and environmental implications.	
Course Outcomes:		**Mapped to PSO**
	CO 1. Understand its scope, branches, and historical development, emphasizing spatial and temporal scales.	PSO1
	CO 2. Apply tectonic theories to explain landforms shaped by internal Earth processes.	PSO2
	CO 3. Analyze the role of weathering, mass movement, and various erosional processes	PSO3

	(fluvial, glacial, aeolian, karst, coastal) in shaping the Earth's surface.			
	CO 4. Develop research interest to solve critical and emerging issues of Geomorphology		PSO4	
Content:		**No of hours**	**Mapped to CO**	**Cognitive Level**
Module 1:	Definitions, Nature and Scope of Geomorphology History of Geomorphology, Basic concepts in Geomorphology Branches of Geomorphology, Hierarchy of spatial and temporal scales in Geomorphology, Geologic time scale, Geomorphology and Tectonics	15	CO1	K2
Module 2:	Internal structure of the Earth: Layers based on physical and chemical properties, Seismic waves and types, Continental Drift Theory, Theory of Plate Tectonics and associated landforms, Folds: Types and landform, Faults: Types and landforms	15	CO2	K3
Module 3:	Process and Applied Geomorphology: Weathering: Types and related landforms, Mass Movement: types of mass movement Slope development and slope facets; forms, processes, and evolution; Evolution of landforms by the process: Fluvial, Glacial & Periglacial, Aeolian, Karst and Coastal Applied Geomorphology: Slopes and landslides, Environmental Geomorphology, Geo-tourism.	15	CO3, CO4	K4
Pedagogy:	Lectures, Group, discussions, tutorials, student Seminars, Presentations, Assignments, Case Studies, Problem Solving Sessions, Experiential learning.			
Texts:	1. Christopherson, R. W. (2011). Geosystems: An Introduction to Physical Geography. In Pearson Education Limited (Vol. 53, Issue 9).			
References/ Readings:	1. Anbazhagan, S., Subramanian, S. K., & Yang, X. (2011). *Geoinformatics in Applied Geomorphology*. https://doi.org/10.1201/b10964			

2. Bloom A.L. 1978: *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms* Prentice – Hall of India, New Delhi.
3. B., W. G. V., & Thornbury, W. D. (1955). *Principles of Geomorphology*. The Geographical Journal, 121(1). https://doi.org/10.2307/1791828
4. Brierley, G. J., & Fryirs, K. A. (2008). *Geomorphology and River Management: Applications of the River Styles Framework.* https://doi.org/10.1002/9780470751367
5. Charlton, R. (2007). *Fundamentals of fluvial geomorphology*. https://doi.org/10.4324/9780203371084
6. Chorley, R. J. (2019). *Introduction to fluvial processes.* (Vol. 3). https://doi.org/10.4324/9780429273315
7. Cooke, R. U., & Warren, A. (2023). *Geomorphology in deserts.* https://doi.org/10.2307/213331
8. Goudie, A. S. (2003). *Geomorphological techniques: Second edition*. https://doi.org/10.4324/9780203430590
9. Gregory, K. J. (2006). *The human role in changing river channels*. Geomorphology, 79(3–4). https://doi.org/10.1016/j.geomorph.2006.06.018
10. Gregory, K. J., & Goudie, A. S. (2011). *The SAGE handbook of geomorphology*. https://doi.org/10.4135/9781446201053
11. Gupta, A., Kale, V. S., Owen, L. A., & Singhvi, A. K. (2007). *Late Quaternary bedrock incision in the Narmada river at Dardi Falls. Current Science*, 93(4).
12. Holmes, A. (1945). *Principles of physical geology*. In GFF (Vol. 67, Issue 1). https://doi.org/10.1080/11035894509446436
13. Hudson, P. F. (2000). *Varieties of Fluvial Form. Geomorphology*, 35(1–2). https://doi.org/10.1016/s0169-555x(00)00020-9
14. J. Lewin and K. J Gregory. (2015). The basics of geomorphology: key concepts. Choice Reviews Online, 52(10), 52-5353-52–5353. https://doi.org/10.5860/choice.189748
15. Kale, V. and Gupta, A. 2001: *Introduction to Geomorphology*, Orient Longman, Kolkata.
16. Kale, V. S. (2012). *Tropical Geomorphology* by Avijit Gupta. Journal of the Geological Society of India, 79(1). https://doi.org/10.1007/s12594-012-0010-6
17. Kale, V.S. (2014): *Landscapes and Landforms of India*, Springer, London/New York.
18. Morisawa, M. (1968). *Streams; their dynamics and morphology*. BioScience, 527(1950).

	19. Pavlopoulos, K., Evelpidou, N., & Vassilopoulos, A. (2009). *Mapping Geomorphological Environments*. https://doi.org/10.1007/978-3-642-01950-0 20. Sharma, V. K. (2010). In *Introduction to Process Geomorphology*. https://doi.org/10.1201/b15108 21. Small, R. J., Bloom, A. L., Cliffs, E., & Hempstead, H. (1979). *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*. The Geographical Journal, 145(3). https://doi.org/10.2307/633235
Web Resources:	https://thebooknotes.in/geomorphology-by-savindra-singh/

Title of the Course	Practicals in Geomorphology
Course Code	GOG-5001
Number of Credits	1
Theory/Practical	Practical
Level	400
Effective from AY	2025-26
New Course	No
Bridge Course/ Value added Course	No
Course for advanced learners	No

Pre-requisites for the Course:	Knowledge of Bachelor's Programme in Geography	
Course Objectives:	1. To study the various aspects of drainage morphometry. 2. To examine the drainage basin for understanding the topographical variations. 3. Understand the role of geomorphic techniques as scientific tools for analyzing landforms.	
Course Outcomes:		**Mapped to PSO**
	CO 1. Understand fundamental concepts of drainage network analysis and relief mapping in geomorphology.	PSO1
	CO 2. Examine the practical applications of stream ordering, morphometric, and relief analysis techniques.	PSO2
	CO 3. Demonstrate proficiency in field techniques for collecting data on channel morphology and geomorphic features.	PSO3

	CO 4. Analyze and interpret data from drainage networks, relief maps, and fieldwork to evaluate the geomorphic characteristics and processes of drainage basins.		PSO4	
Content:		**No of hours**	**Mapped to CO**	**Cognitive Level**
Module 1:	Drainage Network i. Stream ordering and Bifurcation ratio ▪ Strahler's method ▪ Horton's method ii. Morphometric analysis. iii. Slope (isotan), aspect map.	**15**	CO1, CO2	K2, K3
Module 2:	Relief analysis (for a 3 to 5 order drainage basin; based on grid method) i. Absolute relief map ii. Relative relief map iii. Hypsometric analysis iv. Basin cross profiles v. Block diagram (multiple section) Field work: - Measure channel cross-sections in the field. - Prepare a geomorphic map of the channel bed. - Study erosional and depositional features on site.	**15**	CO2, CO3, CO4	K4, K5
Pedagogy:	Lectures, Group, discussions, tutorials, student Seminars, Presentations, Case Studies, Assignments, Problem Solving Sessions, Blended Learning, Flipped Classroom, Experiential Learning.			
Texts:	1. Fryirs, K. A., & Brierley, G. J. (2012). Geomorphic Analysis of River Systems: An Approach to Reading the Landscape. Geomorphic Analysis of River Systems: An Approach to Reading the Landscape. John Wiley and Sons. https://doi.org/10.1002/9781118305454			

References/ Readings:	1. Brierley, G. J., & Fryirs, K. A. (2008). Geomorphology and River Management: Applications of the River Styles Framework. In Geomorphology and River Management: Applications of the River Styles Framework. https://doi.org/10.1002/9780470751367 2. Goudie, A. (1990): Geomorphological Techniques, Un win Hyman, London. 3. Kale, V. S. and Gupta, A. (2001): Introduction to Geomorphology, Orient Longman, Culcutta. 4. King, C. A. M. (1966): Techniques in Geomorphology, Edward Arnold, London.
Web Resources:	https://thebooknotes.in/geomorphology-by-savindra-singh/

Title of the Course	Advanced Climatology
Course Code	GOG-5002
Number of Credits	03
Theory/Practical	Theory
Level	400
Effective from AY	2025-26
New Course	Yes
Bridge Course/ Value added Course	No
Course for advanced learners	Yes

Pre-requisites for the Course:	Nil	
Course Objectives:	• Define the key terms and concepts in climatology, meteorology and atmospheric processes. • Explain the processes of insolation, heat transfer, temperature inversion and greenhouse effect. • Illustrate global patterns of temperature, pressure, humidity and precipitation. • Examine the formation, modification and impact of air masses, monsoons, cyclones and anticyclones.	
Course Outcomes:		**Mapped to PSO**
	CO 1. Identify and define the fundamental concepts in climatology and meteorology.	PSO 1
	CO 2. Explain mechanisms behind temperature variation, pressure systems and global wind system.	PSO 2
	CO 3. Apply concepts like lapse rates and stability to classify atmospheric conditions.	PSO 3

	CO 4. Analyze the causes and effects of weather phenomena such as monsoons, cyclones and airmasses.		PSO 4	
Content:		**No of hours**	**Mapped to CO**	**Cognitive Level**
Module 1:	**Introduction to Climatology and Atmospheric Structure** • Nature and scope of climatology and its relationship with meteorology. Composition, and structure of the atmosphere. • **Temperature:** Insolation, difference between Heat and Temperature, Horizontal and Vertical distributions of insolation, heat balance of the earth, green-house effect, and Inversion of temperature • **Pressure:** Factors affecting air pressure, Pressure changes with altitude, distribution of surface pressure, Pressure measurement and Units	**15**	CO1, CO2	K1, K2
Module 2:	**Atmospheric Moisture and Precipitation Processes** • Stable and Unstable Atmosphere, Factors affecting atmospheric stability, Normal, environmental, dry and wet adiabatic lapse rate, Absolute stability, Absolute instability, Conditional instability, Weather associated with stability and instability • **Atmospheric moisture:** Humidity, Humidity measurement, Changes of state of water, evaporation, Factors affecting Evaporation, condensation, Factors affecting Condensation, • Precipitation: formation, types, acid rain, world pattern of precipitation	**15**	CO2, CO3	K2, K3
Module 3:	**Atmospheric Circulation, Wind Systems, and Weather Phenomena** Wind movement, Global Circulation Model, Tri- cellular theory and Eddy theory. Classical and Modern Theory of Monsoon Air masses and their modifications, Global, Seasonal and Local winds, • Jet stream, Cyclones and Anticyclones	**15**	CO2, CO3, CO4	K2, K3, K4
Pedagogy:	Lectures, Group, discussions, tutorials, student Seminars, Presentations, Case Studies, Assignments, Problem Solving			

	Sessions, Blended Learning, Flipped Classroom, Experiential Learning
Texts:	Climatology, Author: D.S. Lal Atmosphere, Weather and Climate, Authors: Roger G. Barry & Richard J. Chorley
References/ Readings:	1. Critchfield, H. J. (Rep.2010): General Climatology. Prentice Hall, New Delhi. 2. Lal, D. S. (Edition 2003): Climatology. Sharda Pustak Bhawan, 11, University Road, Allahabad, 211002, U. P. 3. Lutgen, Frederick K., Buck, Edward Tar: "The Atmosphere: An Introduction to Meteorology", Prentice Hall, Englewood Cliffs, New Jersey, 0762,1998. 4. Singh, Savindra (Rep.2011): Climatology, Prayag Pub. Allahabad, U. P. India. 5. Trewartha, G. T.: Introduction to Weather and Climate, Mc-Graw- Hill Book Co., New York.
Web Resources:	1. **NOAA Climate Data and Learning** – US-based, rich in graphics, tutorials, and climate trends. 2. e-**PG Pathshala (Geography Modules)** – Free Indian academic resource with climatology modules and PDFs.

Title of the Course	Practicals in Climatology
Course Code	GOG-5003
Number of Credits	01
Theory/Practical	Practical
Level	400
Effective from AY	2025-26
New Course	Yes
Bridge Course/ Value added Course	No
Course for advanced learners	Yes

Pre-requisites for the Course:	Nil	
Course Objectives:	• Identify key atmospheric variables such as maximum and minimum temperatures, humidity and precipitation. • Describe the principles behind temperature and rainfall measurement and climate classification methods. • Interpret upper air charts (Tephigram) and construct climate classification diagrams using Koppen and Thornthwaite methods. • Evaluate water surplus/deficit for crop performance assessment.	
Course Outcomes:		**Mapped to PSO**
	CO 1. Define and retrieve basic weather parameters from observational and instrument data.	PSO 1
	CO 2. Explain how temperature and moisture data relate to atmospheric behavior and crop growth.	PSO 2
	CO 3. Construct and interpret Tephigrams and climate classification models using standard datasets.	PSO 3

	CO 4. Analyze seasonal rainfall variation and its effect on agricultural planning and water resource use.		PSO 4	
Content:		**No of hours**	**Mapped to CO**	**Cognitive Level**
Module 1:	**Temperature Analysis:** Processing of observed data to derive maximum, minimum and daily range of temperature. Analysis of upper air data Tephigram (Temperature-Height diagram) Calculation of relative humidity, dew point and vapor pressure from dry and wet bulb temperature data.	15	CO1, CO2, CO3	K1, K2, K3
Module 2:	**Rainfall Analysis:** Classification of Koppen and Thornthwaite's Climate, Calculation of seasonal rainfall and annual variability of rainfall, Construction of crop-coefficient curve for any one crop. Calculation of water surplus and water deficit amounts during crop growing season. Computation of Water Requirement Satisfaction index. Discomfort index by Thom's (1959) method. Identification and categorization of heat and cold waves	15	CO2, CO3, CO4	K2, K3, K4
Pedagogy:	Lectures, Group, discussions, tutorials, student Seminars, Presentations, Case Studies, Assignments, Problem Solving Sessions, Blended Learning, Flipped Classroom, Experiential Learning			
Texts:	Climatology, Author: D.S. Lal Atmosphere, Weather and Climate, Authors: Roger G. Barry & Richard J. Chorley			
References/ Readings:	1. Doorenbos, J. (1977) and Pruitt W. O. - Crop water requirement, FAO Irrigation and Drainage. 2. Frere and Popov (1979)- Agro-Meteorological Crop Monitoring and Forecasting, FAO Plant Production Paper, No. 17. 3. John F. Mather (1974) - Climatology Fundamentals and Application, Oxford University Press, London. 4. Mather J. R. (1974)- Climatology, Fundamentals and Applications, Mc Graw Hill Book Co, New York. 5. Singh, R. L. & Rana P. B. (1999): Element of Practical Geography, Kalyani Pub. New Delhi. 6. Trewartha, G. T. (1980): An Introduction to Climatology, Mc-Graw-Hill Book Co. New York.			
Web Resources:	1. **NOAA Climate Data and Learning** – US-based, rich in graphics, tutorials, and climate trends. 2. e-**PG Pathshala (Geography Modules)** – Free Indian academic resource with climatology modules and PDFs.			

Title of the Course	Fundamentals of Remote Sensing
Course Code	GOG-5004
Number of Credits	3
Theory/Practical	Theory
Level	400
Effective from AY	2025-2026
New Course	No
Bridge Course/ Value added Course	No
Course for advanced learners	Yes

Pre-requisites for the Course:	Nil	
Course Objectives:	The course is designed to fulfil following objectives: 1. To provide exposure to students in gaining knowledge on concepts and principles of Remote Sensing and Aerial Photography. 2. To understand applications of Remote Sensing in different sectors.	
Course Outcomes:		**Mapped to PSO**
	CO 1. List the basics of Remote Sensing	PSO1
	CO 2. Understand the importance of the Remote sensing and its applications.	PSO2
	CO 3. Acquire confidence in Remote Sensing and GIS related activities which is expanding everywhere across the world	PSO2
	CO 4. Apply and Analyse the knowledge of RS Applications in day-to-day life.	PSO3

Content:		No of hours	Mapped to CO	Cognitive Level
Module 1:	**Introduction to Remote Sensing:** History, development of Remote Sensing, Electro-magnetic Radiation (EMR), Electro-magnetic spectrum and its components, EMR Interactions with Earth's Atmosphere and Surface features, Spectral Reflectance Curve, Advantages & Disadvantages of Remote Sensing. Remote Sensing Platforms, Satellite orbit: Geostationary Satellite and Polar orbiting Satellite, Types of Sensors, Operating Principles of Across & Along Track Scanners.	**15**	CO1, CO2	K1, K2
Module 2:	**Basic Concepts of Remote Sensing:** Resolution, Types of Resolution, Swath and Image Pixel, Spectral information in satellite image, Spectral Signature Curve. Concept of False Color Composite (FCC) and True Color Composite, Satellite Data Products of Indian Remote Sensing, National Aeronautics and Space Administration and European Space Agency, Digital Height Products. Elements of Satellite Image Interpretation: Tone, Color, Texture, Pattern, Shape, Size and associated features	**15**	CO1, CO2	K1, K2, K3
Module 3:	**Introduction to Aerial Photography**: Geometry of the Vertical Aerial Photograph, Classification of Aerial Photography, Scale of Aerial Photograph, Aerial Survey Planning. **Introduction to Photogrammetry**: Photo Scale; Planimetric Measurements on Aerial Photographs: Area, Distance, Relative height; Radial displacement due to	**15**	CO3, CO4	K2, K3, K4

	relief and its controlling factors, Concept of 3D vision, Digital and traditional Photogrammetry, Concept of Anaglyph 3D & Stereo imaging (Photogrammetric instruments: Pocket Stereoscope, Mirror Stereoscope, Parallax Bar). **Applications of Remote Sensing:** Land use Land Cover Changes, Urban Planning, Agricultural practices, Defense, Oil Spills and Ocean studies, Watershed management, Forest Conservation.			
Pedagogy:	1. Interactive Lectures: Discussions, real-world examples, videos, animations, and interactive simulations, to illustrate complex concepts like EMR interactions and spectral signatures. 2. Quizzes and group activities to foster deeper understanding and retention. 3. Hands-on Exercises with Satellite Imagery: Visual image interpretation, focusing on elements like tone, colour, texture, and pattern. 4. Field Trips: Mapping and surveying firms to see how aerial photography and photogrammetry are applied.			
Texts:	1. Thomas, M. Lillesand and Ralph, W. Kefer, Remote Sensing and Image Interpretation, John Wiley & Sons, New York, 1994.			
References/ Readings:	1. Barrett, E. C. and Curtis, L. F.: Fundamentals of Remote Sensing and Air Photo Interpretation, Mcmillan, New York, 1992. 2. Compbell, J.: Introduction to Remote Sensing, Guilford, New York, 1989. 3. Curran, Paul J: Principles of Remote Sensing, Longman, London, 1985. 4. Luder, D: Aerial Photography Interpretation: Principles and Application, McGraw Hill, New York, 1959. 5. Pratt, W. K. Digital Image Processing. Wiley, New York,1978.			
Web Resources:	1. https://www.egyankosh.ac.in/bitstream/123456789/59996/1/Unit7.pdf 2. https://www.nrsc.gov.in/sites/default/files/pdf/ebooks/QRG_on_Remote_Sensing.pdf 3. https://www.nateko.lu.se/sites/nateko.lu.se.sv/files/remote_sensing_and_gis_20111212.pdf 4. https://mlsu.ac.in/econtents/449_Basic%20Concepts%20of%20Remote%20Sensing.pdf			

Title of the Course	Practicals in Remote Sensing
Course Code	GOG-5005
Number of Credits	1
Theory/Practical	Practical
Level	400
Effective from AY	2025-26
New Course	No
Bridge Course/ Value added Course	No
Course for advanced learners	No

Pre-requisites for the Course:	Basic Computer, Cartographic and Remote Sensing knowledge.	
Course Objectives:	1. To acquire skills in storing, managing digital data for planning and development. 2. Preparing Land Use maps and detecting change 3. Interpretation of satellite images	
Course Outcomes:		**Mapped to PSO**
	CO 1. To demonstrate different data representation techniques of Remote Sensing.	PSO2
	CO 2. To identify and download different Geospatial data.	PSO1
	CO 3. To analyze and interpret the Satellite images & Aerial photographs.	PSO3

	CO 4. To create maps using Image classification techniques.		PSO4	
Content		**No. of Hours**	**Mapped to CO**	**Cognitive Level**
Module 1	**Data Representation:** Understanding & Visualizing Satellite Data, Layer Stacking, Layer Mosaic, Band combinations & Color Composites, Identification of features using Color Composite. **Spectral Signatures:** Representation of pixel data in the form of a spectral signature curve, Identification of features using spectral differences **Data Sources:** Downloading free satellite data: Landsat, ASTER, SRTM, Sentinel	**15**	CO 1, CO 2	K2, K 3
Module 2	**Image Interpretation:** Interpretation of satellite image: Landsat TM, Resourcesat, Sentinel, Landsat Thermal Band. **Image Classification & Change Detection:** Generating land use map using satellite image classification techniques, Accuracy Assessment, Area calculations, Change Detection in land use pattern. **Aerial Stereoscopy:** Arrangement of stereopairs, identification and interpretation of features.	**15**	CO 3, CO 4	K4
Pedagogy:	Demonstrations, Problem Solving, Interactive Sessions, Computer based exercises			
Texts:	Practical handbook of remote sensing. (2016). Choice Reviews Online, 53(12), 53-5257-53–5257. https://doi.org/10.5860/choice.196625			
References/ Readings:	1. American Society of Photogrammetry (1983). *Manual of Remote Sensing*. ASP, Falls Church, V.A. 2. Curran, P. J. (1985). *Principles of Remote Sensing*. Longman, London. 3. Campbell, J. (1989). *Introduction to Remote Sensing*. Guilford, New York. 4. Hord, R. M. (1989). *Digital Image Processing of Remotely Sensed Data*. Academic Press. 5. Luder, D. (1959). *Aerial Photography Interpretation: Principles and Application*. McGraw Hill. 6. Pratt, W. K. (1978). *Digital Image Processing*. Wiley, New York.			
Web Resources:	1. https://earthexplorer.usgs.gov – USGS Earth Explorer for downloading Landsat, SRTM data			

	2. https://bhuvan.nrsc.gov.in – ISRO Bhuvan portal 3. https://sentinel.esa.int – ESA Sentinel Open Access Hub 4. https://gisgeography.com – Tutorials and resources for GIS and Remote Sensing 5. https://www.qgistutorials.com – Free QGIS tutorials (Ujaval Gandhi)

Title of the Course	Environmental Geography
Course Code	GOG-5006
Number of Credits	4
Theory/Practical	Theory
Level	400
Effective from AY	2025-26
New Course	No
Bridge Course/ Value added Course	No
Course for advanced learners	No

Pre-requisites for the Course:	Knowledge of Bachelor's Programme in Geography or related Sciences			
Course Objectives:				
Course Outcomes:			**Mapped to PSO**	
	CO 1. Understand environmental geography and key elements.		PSO1	
	CO 2. Analyze their significance, threats, and conservation strategies.		PSO2	
	CO 3. Evaluate causes, effects, and impacts, particularly in India.		PSO3	
	CO 4. Apply Environmental Impact Assessment (EIA) in real-world scenarios.		PSO4	
Content:		**No of hours**	**Mapped to CO**	**Cognitive Level**
Module 1:	Introduction to Environmental Geography: Concept of Environment, major elements of the environment, functioning of	**15**	CO1	K1, K2

	environmental systems, the role of biotic and abiotic elements, approaches and methods in Environmental Geography.			
Module 2:	Ecosystem and Biodiversity: Terrestrial ecosystems: Forest, Grassland, Desert and Agriculture. Biodiversity: Genetic, species, community and ecosystem diversity; biodiversity uses, threats to biodiversity, biodiversity conservation.	**15**	CO1, CO2	K3, K4
Module 3:	Environmental Degradation: Nature and types of degradation-Natural and Anthropogenic degradation, causes and effects of environmental degradation/problems with special reference to the Indian scenario. Global Warming and Its Impacts: Climate Change and Global Warming - Ozone layer depletion, Green House Gases, Impacts of Climate Change and Global warming and measures.	**15**	CO2, CO3	K4, K5
Module 4:	Environmental Management: Environmental planning and policies, Environmental Impact Assessment (EIA). Sustainable development, management of environmental quality.	**15**	CO3, CO4	K3, K5
Pedagogy:	Lectures, Group, discussions, tutorials, student Seminars, Presentations, Assignments, Case Studies, Problem Solving Sessions, Experiential learning.			
Texts:	1. Singh, S.: Environmental Geography, Prayag Publications, Allahabad, 1991. 2. Strahler, A. N., Geography of Man's Environment, John Wiley & Sons Inc. New York, 1984.			
References/ Readings:	1. Bertalanffy, L. General Systems Theory, George Bragiller, New York, 1958. 2. Bodkin, E.: Environmental Studies, Charles E. Merril Pub. Co., Columbus, Ohio, 1982. 3. Manners, I. R. and Mikesell, M. W.(eds.), Perspectives on Environment, Commission on College Geography, Publ. No. 13, Washington, D.C., 1974. 4. Noel, Castree, David, Demeritt, Liverman, Diana & Rhodes, Bruce. A Companion to Environmental Geography-A John Wiley & Sons, Ltd., Publication, 2009. 5. Odum, E. P.: Fundamentals of Ecology, W. B. Saunders, Philadelphia, 1971. 6. Smith, R. L.: Man, and His Environment: An Ecosystem Approach, Harper & Row, London, 1992.			

Discipline Specific Elective Course

Title of the Course	Disaster Mitigation and Management
Course Code	GOG-5201
Number of Credits	04
Theory/Practical	Theory
Level	400
Effective from AY	2025-26
New Course	Yes
Bridge Course/ Value added Course	No
Course for advanced learners	Yes

Pre-requisites for the Course:	NIL	
Course Objectives:	• Identify and classify various types of natural and anthropogenic hazards and disasters. • Explain the causes, spatial distribution, and impacts of both natural and human-induced disasters. • Analyze the role of human activities in increasing disaster vulnerability and risk. • Evaluate disaster management strategies and apply policy frameworks for effective risk reduction and mitigation.	
Course Outcomes:		**Mapped to PSO**
	CO 1. Define, identify, and classify different types of natural and human-induced hazards and disasters.	PSO 1
	CO 2. Understand and describe the causes, locate affected areas and explain the	PSO 2

	environmental and social impacts of disasters.			
	CO 3. Analyze the interaction between human actions and disaster-prone environments to assess risk patterns and apply the knowledge in real life situations.		PSO 3	
	CO 4. Eevaluate the effectiveness of disaster mitigation strategies.		PSO 4	
Content:		**No of hours**	**Mapped to CO**	**Cognitive Level**
Module 1:	**Introduction to disasters:** • Definition, Types of disasters, • Definition: Hazard, Risk & Vulnerability assessment. • Disaster Zonation of the world: Disaster Zonation of the world in terms of Natural Disasters severity scales - Earthquakes, Tropical Cyclones, Tsunamis, Avalanches, Mass movements and Landslides, Floods; Cause and effects and areas affected, Disasters in India.	**15**	CO 1	K1, K2
Module 2:	• **Human-induced, Physical Hazards, Biological & Chemical:** • Types of human-induced hazards: physical, chemical, biological and pollution. • Factors of man-made hazards. • Physical Hazards - Cause and effects of Landslides, Soil erosion, forest fires, desertification etc. • Impact of large river projects such as the Sardar Sarovar, the Tehri Dam, the impacts of excessive irrigation, and effects of thermal and hydel power stations. • Chemical Hazards - Nuclear Hazards, release of toxic elements in the air, soil and water; oil spills. Biological Hazards - Effects of Population growth, its impact on biodiversity, effects of over exploitation of resources, ecological disturbances, pollution.	**15**	CO 2	K2

Module 3:	• Mitigation and Risk Reduction: Measures of Mitigation and Risk Reduction, Structural and Non-structural Measures. • Risk assessment: Meaning, and calculation of risk, Identification and quantification of Potential Hazards and Vulnerabilities, Potential impact of various disasters • Response and Emergency Management: Meaning, Response during and after disaster event, setting up of emergency services.	**15**	CO 1, CO 3	K2, K3,
Module 4:	**Disaster Management and Measures:** • Basic principles of disasters management, Disaster Management cycle, Disaster management policy. • Strategies of risk reduction, disaster preparedness, support system, organizations - role and responsibilities of GO's and NGO's and awareness programs. • National and State Bodies for Disaster Management, Early Warning Systems. • Community Based Disaster Management, Do's and Don'ts during and Post Disaster. • Geospatial Technology in Disaster Management: Preparedness and Planning, Disaster Mapping, Recovery and Rehabilitation.	**15**	CO 2, CO 4	K2, K3, K4
Pedagogy:	Lectures, Group, discussions, tutorials, student Seminars, Presentations, Assignments, Case Studies, Problem Solving Sessions, Blended Learning, Flipped Classroom, Experiential Learning (Field visits)			
Texts:	National Center for Disaster Management (NIDM) Disaster Atlas – South-East Asia			
References/ Readings:	1. Blaikie, P., Cannon, T., Davis, I., et al. 1994: At Risk: Natural Hazards, People's Vulnerability and Disasters, Routledge, London. 2. Hart, M. G. (1986): Geomorphology, Pure and Applied, George Allen and Unwin, London. 3. Paraswamam, S. and Unikrishnan, P. V. (2000): India Disaster Report, Oxford University Press, New Delhi. 4. Quarantelli, E. L. (ed.): What is a Disaster? Perspective on the Question, Routledge, London. 5. Singh, Savindra (2000): Environmental Geography, Parag Pustak Bhavan, Allahabad. 6. Turk, J. (1985): Introduction to Environmental Studies, Saunders, College Publication, Japan.			

	7. Valdiya K. S. (1987): Environmental Geology, Tata McGraw Hill, New Delhi.
Web Resources:	1. National Disaster Management Authority (NDMA), India https://ndma.gov.in 2. National Institute of Disaster Management (NIDM), India https://nidm.gov.in 3. World Health Organization (WHO) – Health Emergency and Disaster Risk Management https://www.who.int/health-topics/emergencies

Title of the Course	Geographical Foundations of Ocean Systems
Course Code	GOG-5202
Number of Credits	4
Theory/Practical	Theory
Level	400
Effective from AY	2025-26
New Course	No
Bridge Course/ Value added Course	No
Course for advanced learners	Yes

Pre-requisites for the Course:	Knowledge of Bachelor's Programme in Geography			
Course Objectives:	The main focus of the course is to understand Ocean System, its functioning and influence on the earth.			
Course Outcomes:			**Mapped to PSO**	
	CO 1. Identify major oceans and their key physical features.		PSO1	
	CO 2. Explain the types of sediments found under ocean.		PSO2	
	CO 3. Assess climate change effects on ocean systems, including El Niño and La Niña.		PSO2, PSO3	
	CO 4. Analyze the geopolitical significance of oceanic regions.		PSO3, PSO4	
	CO 5. Use physical oceanography principles to tackle coastal challenges.		PSO4	
Content:		**No of**	**Mapped**	**Cognitive**

		hours	to CO	Level
Module 1:	**Definition and Meaning of Oceanography:** Foundation of Modern Oceanography, Contribution of Oceanographers in the subject; Post-war Oceanography, Modern Trends; World Oceans, their origin and distribution. **Relief of the Ocean Bottom:** Continental Margin: Continental shelves and slopes, Oceanic Ridges and Rises, Abyssal Plains, Oceanic Trenches, Volcanoes on ocean floor, Coral Reefs and Atolls, Offshore Islands	**15**	CO1	K1, K2
Module 2:	**Marine Sediments:** Lithogenous particles (Derived from Rocks), Biogenous particles (derived from organisms), Hydrogenous particles (derived from Water, Distribution of sediment deposits, Oceanic ooze, and Correlation and age determination	**15**	CO2	K3
Module 3:	**Ocean and Climate:** Ocean-climate interactions; Role in global climate change; El Niño and La Niña phenomena; Climate change impacts on oceans. **Ocean resources:** gaseous, liquefied and solid, chemical parameters, Available resources, Exploited resources, Unexploited resources, Account of known but unexploited oceanic reserves.	**15**	CO3, CO4	K4
Module 4:	**Geopolitics and Oceans:** Geopolitical importance of oceans; Maritime boundaries and international law; Case studies (e.g., Indian Ocean, South China Sea) **Human Impact and Sustainable Management:** Pollution and marine debris; Overfishing and resource depletion; Sustainable Ocean management strategies	**15**	CO4, CO5	K4, K5
Pedagogy:	Lectures, Seminars, Workshops, Fieldwork, Group Projects & Discussions			
Texts:	1. Sharma & Vatal (1962): Oceanography for Geographers. Chaitanya Publishing House, Allahabad 2. Thurman, H. V. (2012). Introductory oceanography /. In Introductory oceanography /. https://doi.org/10.5962/bhl.title.59942			

References/ Readings:	1. Anthropogenic and natural radiative forcing. (2013). In Climate Change 2013 the Physical Science Basis: Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (Vol. 9781107057999). https://doi.org/10.1017/CBO9781107415324.018 2. Hoegh-Guldberg, O., Cai, R., Poloczanska, E. S., Brewer, P. G., Sundby, S., Hilmi, K., Fabry, V. J., & Jung, S. (2015). The ocean. In Climate Change 2014: Impacts, Adaptation and Vulnerability: Part B: Regional Aspects: Working Group II Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. https://doi.org/10.1017/CBO9781107415386.010 3. Klinger, B. A., & Haine, T. W. N. (2019). Ocean Circulation in Three Dimensions. https://doi.org/10.1017/9781139015721 4. Nurse, L. A., McLean, R. F., Agard, J., Briguglio, L. P., Duvat-Magnan, V., Pelesikoti, N., Tompkins, E., & Webb, A. (2015). Small Islands. In Climate Change 2014: Impacts, Adaptation and Vulnerability: Part B: Regional Aspects: Working Group II Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. https://doi.org/10.1017/CBO9781107415386.009 5. Pörtner, H. O., Karl, D. M., Boyd, P. W., Cheung, W. W. L., Lluch-Cota, S. E., Nojiri, Y., Schmidt, D. N., Zavialov, P. O., Drinkwater, K. F., Polonsky, A., Menzel, L., & Wittmann, A. C. (2015). Ocean systems. In Climate Change 2014 Impacts, Adaptation and Vulnerability: Part A: Global and Sectoral Aspects. https://doi.org/10.1017/CBO9781107415379.011 6. Tomczak, M., & Godfrey, J. S. (1994). Regional oceanography: an introduction. Regional Oceanography: An Introduction. https://doi.org/10.1016/0278-4343(95)00021-6

Title of the Course	Soil Geography and Analysis
Course Code	GOG-5203
Number of Credits	4
Theory/Practical	Theory
Level	400
Effective from AY	2025-26
New Course	No
Bridge Course/ Value added Course	
Course for advanced learners	Yes

Pre-requisites for the Course:	Knowledge of the Bachelor's Programme in Geography	
Course Objectives:	This course provides students with a foundational understanding of soil formation, classification, degradation, conservation, and interdisciplinary applications, while also equipping them with practical skills in soil analysis and management.	
Course Outcomes:		**Mapped to PSO**
	CO 1. Explain fundamental terms and concepts of soil geography.	PSO 1
	CO 2. Categorize different soils using international and national classification systems.	PSO 1
	CO 3. Assess the causes and effects of soil degradation and its management.	PSO 4
	CO 4. Apply field and lab techniques for soil analysis and its conservation.	PSO 2

Content:		No of hours	Mapped to CO	Cognitive Level
Module 1:	**Introduction to Soil and its Formation:** Concepts and Definition, Nature and Scope of Soil Geography. Importance of soil, Approaches in soil geography. Factors of soil formation (climate, topography, vegetation), parent material and soil, mineral component of soil and soil organic matter. Development of the soil profile and horizon.	15	CO 1	K1, K2
Module 2:	**Classification System and Soil type**: USDA Soil Taxonomy, FAO, World Spatial Distribution of Soil (Vertical and Lateral). Types of Soils: Soil in India, Soil in Goa. **Soil Properties & Quality:** Soil Texture, Soil Structure, Soil Color, Bulk Density, Porosity, Permeability, Soil Moisture and Temperature, Acidity and Alkalinity, Soil pH, Nutrient Cycling.	15	CO 2	K2, K3
Module 3:	**Soil Degradation and Management**: Salinization, Acidification, Erosion, Soil fertility decline, Soil contamination, Deforestation, Overgrazing, Methods of farming. Methods of soil conservation and reclamation. Maintenance of Soil Productivity, Fertilizers and Pesticides, Soil Quality and Sustainable Land Management.	15	CO 3	K3, K4, K5
Module 4:	**Soil Analysis and Applications**: Field techniques for soil sampling, Testing of Physical, Chemical and Biological properties of soil. Interpretation of soil analysis report. Application of Soil Geography in Agriculture, Planning and other relevant branches of Geography.	15	CO 4	K5, K6
Pedagogy:	Lectures, Group, discussions, tutorials, student Seminars, Presentations, Case Studies, Assignments, problem-solving sessions, Blended Learning, Flipped Classroom, Experiential and Practical Learning (Field visits)			
Texts:	Fundamentals of Soil Geography, Soils and Soils of India, Soil and Biogeography, Geography of Soils.			

References/ Readings:	1. Birkeland, P. W. (1999): Soil and Geomorphology, Oxford University Press Inc., New York. 2. Brady, N. C. (1984): The Nature and Properties of Soils. Macmillan Publishing Company, New York and Collier Macmillan Publishers, London. 3. Bunting, B. T. (1969): Geography of Soil, Hutchinson University Library, London. 4. Cruickshank, J. G. (1972): Soil Geography, David and Charles (publishers) Limited, Newton Abbot. 5. Carter, M. R., & Gregorich, E. G. (Eds.). (2008). *Soil sampling and methods of analysis* (2nd ed.). Boca Raton, FL: CRC Press. 6. Bridges, E. M. and Davidson, D. A. (1982): Principles and Applications of Soil Geography, Longman Group, London. 7. Jenny, H. (1994). *Factors of soil formation: A system of quantitative pedology*. Dover Publications. 8. Buol, S. W., Southard, R. J., Graham, R. C., & McDaniel, P. A. (2011). *Soil genesis and classification* (6th ed.). Wiley-Blackwell. 9. Carter, M. R., & Gregorich, E. G. (Eds.). (2008). *Soil sampling and methods of analysis* (2nd ed.). CRC Press. 10. Charman P.E.V and Murphy B.W. (2000): Soils : Their Properties and Management, Oxford University Press, Melbourne, Australia. 11. ICAR–NBSS&LUP. (2012). *Soils of India*. National Bureau of Soil Survey and Land Use Planning, Nagpur. 12. Lal, R. (2001). Soil degradation and restoration. CRC Press. 13. Directorate of Agriculture, Government of Goa. (2017). *Soil health status of Goa*. Panaji: Soil Testing Laboratory Report.
Web Resources:	1. FAO. (2022). *World reference base for soil resources (WRB)*. Food and Agriculture Organization of the United Nations. https://www.fao.org/soils-portal. 2. https://www.goa.gov.in/wpcontent/uploads/2020/03/cir.-sss-dev.-of-manures-and-fertilizers-2016-17_compressed.pdf 3. Directorate of Agriculture; Agriculture in Goa at a Glance: https://www.agri.goa.gov.in/Overview

Title of the Course	Social and Cultural Geography
Course Code	GOG-5204
Number of Credits	04
Theory/Practical	Theory
Level	400
Effective from AY	2025-26
New Course	Yes
Bridge Course/ Value added Course	No
Course for advanced learners	Yes

Pre-requisites for the Course:	Nil	
Course Objectives:	• Recall key terms, definitions, and concepts in social and cultural geography. • Explain the scope, significance, and basic frameworks of social and cultural geography. • Apply geographical concepts to understand social issues like poverty, housing, crime, and inequality. • Analyze patterns of cultural diffusion, identity formation, and social transformation in different regions.	
Course Outcomes:		**Mapped to PSO**
	CO 1. Recall and define foundational concepts of social and cultural geography.	PSO 1
	CO 2. Explain spatial aspects of social structures like caste, class, tribe, and gender.	PSO 2
	CO 3. Apply geographic principles to analyze social problems such as inequality and migration.	PSO 3
	CO 4. Analyze the interrelations between culture, identity, and spatial structures.	PSO 4

Content:		No of hours	Mapped to CO	Cognitive Level
Module 1:	**Foundations of Social Geography** • Introduction: Definitions, conceptual and methodological approaches, major trends and developments in Social Geography • Concept of Space: Individual's space, intimate, personal, social and public space • Social Space and Interaction: How space influences social relations and vice versa • Social Groups: Primary and secondary groups, their spatial significance • Processes of Social Change: Industrialization, migration, urbanization, modernization, globalization and Sanskritization	**15**	CO1	K1, K2
Module 2:	**Social Structures and Spatial Patterns** • Social Stratification**:** Role of caste, class, ethnicity and tribe in shaping spatial patterns • Social Well-being and Disparities**:** Health, education and access to services • Social-Cultural Regions in India**:** Based on race, religion, language, dialect, and tribe • Models of Assimilation and Segregation**:** Spatial impacts in urban and rural settings	**15**	CO1, CO2,	K1, K2
Module 3:	**Foundations of Cultural Geography** • Culture and Space**:** Origin and diffusion of culture, environmental perception and cultural adaptation • Cultural Concepts**:** Cultural traits, complexes and landscapes • Cultural Realms and Regions**:** World and Indian perspectives • Language, Religion, and Ethnicity**:** Spatial expression and role in shaping cultural identity • Individual and Collective Cultural Expression**:** Influence on place-making and	**15**	CO2, CO3, CO4	K2, K3, K4

	landscape			
Module 4:	**Contemporary Issues in Cultural Geography** • Globalization and Cultural Change: Cultural convergence, hybridization and resistance • Cultural Conflicts and Integration: Ethnic and religious tensions and cooperation • Sacred Spaces and Symbolic Landscapes: Religion, memory, and territory • Indigenous Knowledge Systems: Sustainability and cultural resilience • Social Problems and Regional Disparities: Housing, Crime, Poverty and Inequality in Spatial Context • Geography of Poverty and Social Exclusion	**15**	CO2, CO3, CO4	K2, K3, K4
Pedagogy:	Lectures, Group, discussions, tutorials, student Seminars, Presentations, Case Studies, Assignments, Problem Solving Sessions, Blended Learning, Flipped Classroom			
Texts:	*Social Geography*, Author: Aijazuddin Ahmed *Cultural Geography*, Author: Majid Husain			
References/ Readings:	1. Aijazuddin, Ahmad (1999). Social Geography, Rawat Publications, New Delhi. 2. Brian, R. K. (1996). Landscape of Settlement: Prehistory to the Present. Routledge. London. 3. Bulsara, J. F. (1970). Patterns of Social Life in Metropolitan Areas, Popular Prakashan, Bombay. 4. Carter, H. J. (1972). The Study of Urban Geography. Edward Arnold. London. 5. Census of India (1974). Economic and Socio-Cultural Dimensions of Rationalization, Census Centenary, Monograph No. 7, Govt. of India, New Delhi. 6. Knox, P., & Marston, S. (2016). Human Geography: Places and Regions in Global Context. 7. Jordan, T.G., Domosh, M., Rowntree, L. (2013). The Human Mosaic: A Thematic Introduction to Cultural Geography			
Web Resources:	**DOAJ – Directory of Open Access Journals** https://www.doaj.org **Geography Compass – Wiley:** https://onlinelibrary.wiley.com/journal/17498198			

SEMESTER II

Discipline Specific Core Courses

Title of the Course	Population Geography
Course Code	GOG-5007
Number of Credits	03
Theory/Practical	Theory
Level	400
Effective from AY	2025-26
New Course	No
Bridge Course/ Value added Course	No
Course for advanced learners	No

Pre-requisites For the Course:	NIL	
Course Objectives:	1. The main focus of this course is to introduce students to the theories in Population Geography and Demography. 2. The course will enable students to examine the patterns and trends associated with migration. 3. Students will also associate the relation between population and resources with contemporary examples.	
Course Outcomes:		**Mapped to PSO**
	CO 1. Understand Global and Regional Population Dynamics	PSO 1

	CO 2. Analyze Migration Patterns and Theories		PSO 2	
	CO 3. Evaluate Population–Resource Relationships		PSO 3	
	CO 4. Assess Contemporary Population Issues and Policies		PSO 4	
Content:		**No of hours**	**Mapped to CO**	**Cognitive Level**
Module 1:	**Population as a Geographic Subject:** Scope, development and recent trends of population geography and its interdisciplinary nature, Population geography and demography.	**15**	CO1	K1, K2
Module 2:	**Human Population over Time and Space:-** World population growth and distribution, overview of population growth. Determinants of Fertility and Mortality, Demographic Transition Theory and its relevance. Case Study of India and one of its States.	**15**	CO1, CO2	K2, K4
Module 3:	**Population and Resources:** Population versus resources - Under population, overpopulation and optimum population, Malthusian theory of population and analysis of Global Crises. Population-Development and environment.	**15**	CO2, CO3	K4, K5
Module 4:	**Population Issues-Global and India** China: Population control Policy and consequences. Racism, population dynamics of western world, India Billion Plus and Consequences, India's Population policy, declining gender ratio, women equity and empowerment in India. Changing age structure and Ageing Population, Human development Index.	**15**	CO3, CO4	K5, K6
Pedagogy:	Lectures, Group, discussions, tutorials, student Seminars, Presentations, Assignments, Case Studies, Problem Solving Sessions, Blended Learning, Flipped Classroom			
Texts:	Hassan, M. I. (2020). Population geography: A systematic exposition. In Population Geography: A Systematic Exposition. https://doi.org/10.4324/9781003007982			

References/ Readings:	1. Bose, Ashish et al.: Population in India's Development (1947-2000): Vikas Publishing House, New Delhi, 1974. 2. Bose, Ashish: India's Billion Plus People- 2001 Census Highlights, Methodology and Media Coverage, B. R. Publishing Corporation, New Delhi. 2001. 3. Census of India, India: A State Profile, 2001 and 2011. 4. Chandna, R. C. Geography of Population: Concept, Determinants and Patterns,Kalyani Publishers, New York, 2000 (Reprint 2012). 5. Clarke, John I.: Population Geography, Pergamon Press, Oxford, 1973. 6. Daugherty, Helen Gin, Kenneth C. W., Kammeryir, An Introduction to Population Geography (Second Edition), The Guilford Press, New York, London, 1998. 7. Garnier, B. J. Geography of Population, Longman, London, 1970 (Reprint 2018). 8. Mitra, Asok: India's Population Aspects of Quality and Control, Vol. I & II. Abhinav Publication, New Delhi, 1978. 9. Mamoria,C.B.: India's Population Problem:Kitab Mahal, New Delhi, 1981. 10. Premi, M. K. India's Population: Heading Towards a Billion, B. R. Publishing Corporation, New Delhi, 1991. 11. Srinivasan, K.: Basic Demographic Techniques and Applications,SagePub., New Delhi, 1998.
Web Resources:	1. https://www.scribd.com/document/508090008/development-and-importance-of-population-geography? 2. https://nap.nationalacademies.org/read/10144/chapter/5#26 3. https://ebooks.inflibnet.ac.in/antp12/chapter/population-growth-and-development/? 4. https://en.wikipedia.org/wiki/Ernst_Georg_Ravenstein? 5. https://en.wikipedia.org/wiki/Malthusianism?

Title of the Course	Practicals in Population Geography
Course Code	GOG-5008
Number of Credits	1
Theory/Practical	Theory
Level	400
Effective from AY	2025-2026
New Course	No
Bridge Course/ Value added Course	No
Course for advanced learners	Yes

Pre-requisites for the Course:	Theoretic knowledge of demographic parameters and basics of computation.			
Course Objectives:	The main focus of this course is to calculate population data and represent in graphical form.			
Course Outcomes:			**Mapped to PSO**	
	CO 1. Know the basic calculations of Population Studies		PSO1	
	CO 2. Understand various concepts, theories and models.		PSO2	
	CO 3. The knowledge in real situations.		PSO2	
	CO 4. Analyse and Interpret the relationships between the data using simple statistical techniques.		PSO3	
Content:		**No of hours**	**Mapped to CO**	**Cognitive Level**

Module 1:	**Methods of Population data collection** Basic sources of population data, collection and processing of demographic data: Census, sample survey and registration. Processes involved. **Methods of Calculation of population data** Fertility, Mortality, Population growth and projections (semi average method, least square method, Exponential population growth), construction of life Tables, population density and concentration index. Dependency ratio, calculation of human development Index.	**15**	CO1, CO2, CO3	K1, K2, K3
Module 2:	**Methods of representation of population data** Pie chart, Age and sex pyramid and types, Trilinear chart, Flow diagram, Choropleth, Proportional circles, divided proportional circles, level of urbanization. **Model testing:** Demographic Transition model, rank size rule, nearest neighbourhood index. Settlement Geography – Rural-urban composition and ratio, Gini's concentration, Primacy Index and rank size rule.	**15**	CO2, CO3, CO4	K1, K2, K3
Pedagogy:	In-Class interactions: Group Discussion, Calculations, Demonstrations, problem-solving sessions.			
Texts:	Hassan, M. I. (2020). Population geography: A systematic exposition. In Population Geography: A Systematic Exposition. https://doi.org/10.4324/9781003007982			

References/ Readings:	1. Bose, Ashish et al.: Population in India's Development (1947-2000): Vikas Publishing House, New Delhi, 1974. 2. Census of India, India: A State Profile, 2001 and 2011. 3. Chandna, R. C. Geography of Population: Concept, Determinants and Patterns, Kalyani Publishers, New York, 2000 (Reprint 2012). 4. Clarke, John I.: Population Geography, Pergamon Press, Oxford, 1973. 5. Garnier, B. J. Geography of Population, Longman, London, 1970 (Reprint 2018). 6. Mitra, Asok: India's Population Aspects of Quality and Control, Vol. I & II. Abhinav Publication, New Delhi, 1978. 7. Premi, M. K. India's Population: Heading Towards a Billion, B. R. Publishing Corporation, New Delhi, 1991. 8. Srinivasan, K.: Basic Demographic Techniques and Applications, Sage Publications, New Delhi, 1998.
Web Resources:	https://www.britannica.com/science/population-density https://www.population.gov.sg/media-centre/articles/how-is-the-tfr-calculated/ https://upscsociology.in/human-development-index-hdi-its-formula/

Title of the Course	Economic Geography
Course Code	GOG-5009
Number of Credits	03
Theory/Practical	Theory
Level	400
Effective from AY	2025-26
New Course	Yes
Bridge Course/ Value added Course	No
Course for advanced learners	Yes

Pre-requisites for the Course:	NIL	
Course Objectives:	• Recall and understand the scope, concepts, and approaches in Economic Geography. • Explain theories of industrial location and spatial distribution of agriculture, industries, and markets. • Analyze regional disparities, transportation networks, and market systems using real-world examples. • Evaluate the impact of globalization and technological changes on economic development and the environment.	
Course Outcomes:		**Mapped to PSO**
	CO 1. Recall and describe key concepts, approaches, and classifications used in Economic Geography.	PSO 1
	CO 2. Explain the location theories of agriculture and industry, and apply them to real-world case studies.	PSO 1, PSO 2
	CO 3. Analyze patterns of transportation, market systems, and accessibility in regional	PSO 2, PSO 3

	development.			
	CO 4. Evaluate the effects of regional disparities, the Green Revolution, and globalization on India's economy and ecology.		PSO 3, PSO 4	
Content:		**No of hours**	**Mapped to CO**	**Cognitive Level**
Module 1:	**Introduction to Economic Activities** • Scope, content and recent trends in Economic Geography, Relation of Economic Geography with other social sciences, Approaches in Economic Geography, • Factors of location of economic activities (Physical, social, economic and cultural) • Classification of economies; sectors of economy (primary, secondary and tertiary). **Agricultural regions** • Concept and techniques of delimitation of agricultural regions, crop combination and diversification-Von Thunen's model and its modifications.	**15**	CO 1, CO 2	K1, K2, K3
Module 2:	**Industries** • Classification of industries: Resource based and footloose industries, • Theories of industrial location-Weber, Losch and Isard; • Case studies of selected industries: Iron and Steel, Aluminum, Chemical, Oil refining and Petrochemical, Engineering, Textile.	**15**	CO 1, CO 2	K1, K2, K3
Module 3:	**Transportation** • Modes of transportation and transport cost; • Accessibility and connectivity: international, inter and intraregional; comparative cost advantages. • Typology of markets, market network in rural societies, market system in urban economy, role of market in the development of trade and commerce.	**15**	CO 3, CO 4	K2, K3, K4

	Economic development of India 1. Regional disparities, Impact of green revolution on Indian economy, Globalization and Indian economy and its impact on environment.			
Pedagogy:	Lectures, Group, discussions, tutorials, student Seminars, Presentations, Assignments, Case Studies, Problem, Solving Sessions, Blended Learning, Flipped Classroom			
Texts:	1. Majid Husain, Human and Economic Geography. 2. Guha, J. L. & Chattoraj, P. R. A New Approach to Economic Geography			
References/ Readings:	1. Berry, J. L. (1967): Geography of Market Centres and Retail Distribution. Prentice Hall. New York. 2. Chatterjee, S. P. (1984): Economic Geography of Asia. Allied Book Agency, Calcutta. 3. Chorley, R. J. and Haggett, P. (1969): Network Analysis in Geography: Arnold, London. 4. Dreze, J. and Sen, A. (1996). India- Economic Development and Social Opportunity. Oxford University Press, New Delhi. 5. Eckarsley, R. (1995). Markets, the State and the Environment. McMillan. London. 6. Garnier, B. J. and Deblize (1979). A Geography of Marketing. Longman. London.			
Web Resources:	1. FAO – Food and Agriculture Organization Statistics https://www.fao.org/faostat 2. IndiaStat – Indian Economic & Social Statistics https://www.indiastat.com			

Title of the Course	Practicals in Economic Geography
Course Code	GOG-5010
Number of Credits	01
Theory/Practical	Practical
Level	400
Effective from AY	2025-26
New Course	Yes
Bridge Course/ Value added Course	No
Course for advanced learners	Yes

Pre-requisites for the Course:	Theoretic knowledge of Economic Geography and basics of computation.	
Course Objectives:	• Understand basic methods used to study agriculture, transport, and trade patterns. • Use formulas and models to measure crop patterns and transport networks. • Study and compare transport and trade connections using graphs and data. • Explain movement of goods and people using models like the gravity model.	
Course Outcomes:		**Mapped to PSO**
	CO 1. Recall and explain basic terms and formulas used in agriculture and transport studies.	PSO 1
	CO 2. Use formulas to measure crop patterns and transport connections.	PSO 1, PSO 2
	CO 3. Compare and study transport and trade networks using data and graphs.	PSO 2, PSO 3
	CO 4. Explain and analyse movement of goods and people using models like the gravity and	PSO 2, PSO 3, PSO 4

	breaking point models.			
Content:		**No. of Hours**	**Mapped to CO**	**Cognitive Level**
Module 1:	• **Crop Concentration:** Bhatia's method, Jasbir • **Crop Diversification:** Singh's modified method, Gibbs Martins Index • **Crop Combination:** Bhatia's method, Maximum Positive Deviation method of Rafiullah (1956), Athawale's method of crop combination (1966) • **Agricultural efficiency:** Aiyar's method, Sapre and Deshpande, Calories per head, Standard Nutritional Units per hectare	**15**	CO 1, CO 2	K1, K2, K3
Module 2:	• **Lorenz Curve:** Gini coefficient • **Transport Network:** Theoretical measures of transport network and Graphical Representation: Non-ratio measures cyclomatic number diameter, Ratio measures: Eta, Theta, Iota, Pi, Measurement of route, Measures of Individual elements of transport: Associated number, Degree of connectivity network, Dispersion or Accessibility Index • **Models of Spatial Interaction**: Gravity model, Potential Population Surfaces, Breaking Point Theory –Trade area delimitation. Law of retail trade gravitation.	**15**	CO 1, CO 3, CO 4	K1, K2, K3, K4
Pedagogy:	Demonstrations, problem-solving sessions.			
Texts:	1. Singh, R.L. (1992). Elements of Practical Geography 2. Hussain, M. (2015). Agricultural Geography 3. Ghosh, S. (1999). Introduction to Methods in Human Geography			
References/ Readings:	1. Chorley, R. J. and Hagget, P. (1971). Models in Geography. Methuen and Co. London. 2. Hussain, M. (1996). Systematic Agricultural Geography. Rawat Publication. Jaipur. 3. Lloyd and Dickens (1972). Location in Space Theoretical Approach to Economic Geography. Harper and Raw Publication. London. 4. Singh, Jasbir (1987). Agricultural Geography. Tata McGraw Publication. New Delhi. 5. Yeats, M. H. (1978). An Introduction to Quantitative Analysis in Human Geography, New York.			
Web Resources:	1. National Agricultural Innovation Project – ICAR			

	https://nahep.icar.gov.in 2. FAO Statistical Database (FAOSTAT) https://www.fao.org/faostat 3. Transport Geography – Hofstra University https://transportgeography.org

Title of the Course	Fundamentals of Geographic Information System
Course Code	GOG-5011
Number of Credits	3
Theory/Practical	Theory
Level	400
Effective from AY	2025-2026
New Course	No
Bridge Course/ Value added Course	No
Course for advanced learners	Yes

Pre-requisites for the Course:	Basic knowledge of Remote Sensing	
Course Objectives:	1. Students will acquire knowledge different components & functions of GIS. 2. To examine and identify online open-source software. 3. To study GIS data models and GIS software to create various types of maps.	
Course Outcomes:		**Mapped to PSO**
	CO 1. Acquire Knowledge about Indian Remote sensing.	PSO1
	CO 2. Investigate Components and function of GIS	PSO2
	CO 3. Study GIS Data models.	PSO2
	CO 4. Use GIS software to prepare the various types of maps in geography with the help of cartographic Techniques of GIS software.	PSO3, PSO4

Content:		No of hours	Mapped to CO	Cognitive Level
Module 1:	**Introduction to GIS:** Definition, Components & Functions of GIS, Advantage over traditional map making, Interdisciplinary approach of GIS **Geospatial Data:** Geographical Data Models and Structures, Advantages and disadvantages of using raster and vector formats, Sources of Geographical data	**15**	CO1, CO2	K1, K2
Module 2:	**Types of GIS & GIS software:** GIS Types: Desktop GIS, Web GIS, Mobile GIS Software: Proprietary GIS (ESRI ArcGIS, Map Info, and Global Mapper) and Open-source GIS (Quantum GIS, Grass and Saga GIS). **Data visualization & Integration:** Representation of Geospatial data, Layout formats, Colour Combination & Standardizations, Visualizing data on: GIS portal and Google Earth, Integrating GIS and Google Earth.	**15**	CO1, CO2	K1, K2, K3
Module 3:	**Applications of GIS:** Case studies on the use of GIS in following fields: Watershed Management, Land Cover Dynamics, Socio-cultural Settings, Transportation, mining, Land Surface Temperature, Environmental Impact Assessment, Land Capability & Suitability study. **Global Positioning System (GPS):** Introduction to GPS: GPS Segments, Satellite Constellations, Working Principles, GPS Errors, GPS receivers: Handheld GPS, DGPS. GPS Accuracy and Applications.	**15**	CO3, CO4	K2, K3, K4
Module 4:	**Types of GIS & GIS software:** GIS Types: Desktop GIS, Web GIS, Mobile GIS Software: Proprietary GIS (ESRI ArcGIS, Map Info, and Global Mapper) and Open-source GIS (Quantum GIS, Grass and Saga GIS).	**15**	CO1, CO2	K1, K2

	Data visualization & Integration: Representation of Geospatial data, Layout formats, Colour Combination & Standardizations, Visualizing data on: GIS portal and Google Earth, Integrating GIS and Google Earth.			
Pedagogy:	1. Interactive Lectures: Discussions, real-world examples, videos, animations, and interactive simulations. 2. Quizzes and group activities to foster deeper understanding and retention. 3. Field Trips: Mapping and surveying firms to see how aerial photography and photogrammetry are applied. 4. Assignments: Case Studies, Problem Solving Sessions, Blended Learning, Flipped Classroom			
Texts:	1. Bolstad, P. (2016). GIS Fundamentals: A First Text on Geographic Information System5 th Edition. In Manual of Geospatial Science and Technology, Second Edition. 2. Goodchild, M. F. (2003). Geographic information science and systems for environmental management. Annual Review of Environment and Resources, 28. https://doi.org/10.1146/annurev.energy.28.050302.105521 3. Morgan, C. T. (2012). Essentials of Geographic Information Systems. Foundation Saylor.			
References/ Readings:	1. Burrough, P.A. Principles of Geographic Information Systems for Land Resource Assessment Oxford University Press, New York, 1986. 2. Fraser Taylor, D.R. Geographic information Systems Pergamon Press, Oxford, 1991. 3. Maquire, D.J.M.F. Goodchild and D.W. Rhind (eds.) Geographic Information Systems: Principles and Application. Taylor & Francis, Washington. 1991. 4. Mark, S. Monmonier. Computer-assisted Cartography. Prentice-Hall, Englewood Cliff, New Jersey, 1982. 5. Peuquet, D. J. and D. F. Marble, Introductory Reading in Geographic Information Systems. Taylor & Francis, Washington, 1990. 6. **Star, J and J.** Estes, Geographic Information Systems: An Introduction, Prentice Hall, Englewood Cliff, New Jersey, 1994.			
Web Resources:	1. https://www.esri.com/en-us/what-is-gis/history-of-gis 2. https://gisgeography.com/history-of-gis			

	3. https://www.govloop.com/top-10-benefits-of-gis-technology/ 4. https://grindgis.com/geography/advantages-and-disadvantages-of-cartography 5. https://unearthlabs.com/blog/modern-cartography/ 6. https://unearthlabs.com/blog/gis-uses/urban-planning/

Title of the Course	Practicals in Geographical Information Systems	
Course Code	GOG-5012	
Number of Credits	1	
Theory/Practical	Practical	
Level	400	
Effective from AY	2025-26	
New Course	No	
Bridge Course/ Value-added Course	No	
Course for advanced learners	No	
Pre-requisites for the Course:	GOG-5004, GOG-5005	
Course Objectives:	• Students will acquire knowledge of different components & functions of GIS. • Students will be able to examine and identify online open-source software. • They will also study GIS data models and use GIS software to create various types of maps.	
Course Outcomes:		**Mapped to PSO**
	CO 1. Apply GIS techniques to access, georeference, digitize, and organize geospatial vector and raster data effectively.	PSO 2
	CO 2. Demonstrate skills in editing spatial and attribute data and queries, managing topology,	PSO 4

	and maintaining data accuracy in GIS.			
	CO 3. Implement GIS knowledge in performing vector layer operations.		PSO 3	
	CO 4. Understand the functioning of GPS receivers, the process of collecting waypoints, and the method of importing GPS data into GIS software for spatial analysis		PSO 2	
Unit/Module	**Content**	**No. of Hours**	**Mapped to CO**	**Cognitive Level**
Module 1	**Geospatial Data Access:** Accessing existing data into GIS, creating multiple copies, re-projecting vector and raster files, Map Projections and Datum, Symbology, Geo-referencing. **Digitization:** Creating vector layers in GIS, Basic and Advanced editing, Topology building **Attribution**: Creating and modifying attribute tables, attaching attribute information to vector layers, using field calculators	15	CO 1 CO 2	K3
Module 2	**Data Retrieval:** Querying, Attribute Queries and Spatial Queries, Saving query outputs **Vector operations:** Merge, Dissolve, Intersect, Union, Clip, Erase and spatial join **GPS Survey:** Handling GPS receiver, taking waypoints, Importing GPS points in GIS software	15	CO 2 CO 3 CO 4	K2 K3
Pedagogy:	Demonstrations, Problem Solving, Interactive Sessions, Computer based exercises			
Texts:	Abildskov, J. (2020). Practical GIS Use tools such as QGIS, PostGIS, and GeoServer to build powerful GIS solutions. In Practical Git.			
References/ Readings:	1. Burrough, P. A., & McDonnell, R. A. (1998). Principles of geographical information systems (2nd ed.). Oxford University Press.			

	2. Heywood, I., Cornelius, S., & Carver, S. (2011). An introduction to geographical information systems (4th ed.). Pearson Education. 3. Chang, K. (2016). Introduction to geographic information systems (8th ed.). McGraw-Hill Education. 4. Lo, C. P., & Yeung, A. K. W. (2009). Concepts and techniques of geographic information systems (2nd ed.). Pearson Prentice Hall. 5. American Society of Photogrammetry (1983). *Manual of Remote Sensing*. ASP, Falls Church, V.A. 6. Curran, P. J. (1985). *Principles of Remote Sensing*. Longman, London. 7. Campbell, J. (1989). *Introduction to Remote Sensing*. Guilford, New York. 8. Hord, R. M. (1989). *Digital Image Processing of Remotely Sensed Data*. Academic Press. 9. Luder, D. (1959). *Aerial Photography Interpretation: Principles and Application*. McGraw Hill. 10. Pratt, W. K. (1978). *Digital Image Processing*. Wiley, New York.
Web Resources:	1. https://earthexplorer.usgs.gov – USGS Earth Explorer for downloading Landsat, SRTM data 2. https://bhuvan.nrsc.gov.in – ISRO Bhuvan portal 3. https://sentinel.esa.int – ESA Sentinel Open Access Hub 4. https://gisgeography.com – Tutorials and resources for GIS and Remote Sensing 5. https://www.qgistutorials.com – Free QGIS tutorials (Ujaval Gandhi)

Title of the Course	Quantitative and Statistical Techniques in Geographic Research
Course Code	GOG-5013
Number of Credits	04
Theory/Practical	Theory
Level	500
Effective from AY	2025-26
New Course	Yes
Bridge Course/ Value added Course	No
Course for advanced learners	Yes

Pre-requisites for the Course:	Basic knowledge of Statistics	
Course Objectives:	• Understand and differentiate geographical data sources, sampling techniques, and their significance in data collection. • Apply statistical methods, including measures of central tendency, partition values, correlation, and regression, to analyze geographical data.	
Course Outcomes:		**Mapped to PSO**
	CO 1. Explain the relevance of statistics in geographical research and data sources.	PSO 2
	CO 2. Classify and tabulate various types of geographical data accurately.	PSO 2
	CO 3. Calculate and interpret central tendency and partition values in data sets.	PSO 3
	CO 4. Analyze relationships using correlation and regression methods in geographical studies.	PSO 4

Content:		No of hours	Mapped to CO	Cognitive Level
Module 1:	• Importance and relevance of Statistics in Geography and Geographical Research • Data Sources: Census, SRS, NSS, Field data Collection • Sample: Significance in research and data collection, advantages of sampling, sampling methods, Sampling Techniques, random numbers. Sampling Plan • Frequency & cumulative frequency distribution, Graphical & Diagrammatic representation. • Classification, Tabulation (format) and types of tables	**15**	CO1, CO2	K1, K2
Module 2:	• Measures of central tendency: Arithmetic & Weighted Mean, Median, Mode • Partition Values: Quartiles, Deciles and Percentiles for Grouped & Ungrouped data. • Combined mean.	**15**	CO2, CO3	K2, K3
Module 3:	• Measures of Dispersion: Absolute measures of dispersion and skewness: Range, Quartile Deviation, Mean Absolute Deviation, Standard Deviation, Variance. Coefficient of variation (C.V.)	**15**	CO2, CO3, CO4	K2, K3, K4
Module 4:	• Co-relation and Regression analysis: Scatter Diagram, Karl Person's Co-efficient correlation, Spearman's rank Correlation, Kendall's rank correlation, Regression analysis. • Statistical calculations and graphical presentation by hand and spreadsheets or statistical software (e.g. Microsoft Excel etc.)	**15**	CO2, CO3, CO4	K2, K3, K4
Pedagogy:	Lectures, Group, discussions, tutorials, student Seminars, Presentations, Case Studies, Assignments, Problem Solving Sessions, Blended Learning, Flipped Classroom, Experiential learning			
Texts:	McCarroll, D. (2016). Simple statistical tests for geography. In Simple Statistical Tests for Geography. https://doi.org/10.1201/9781315380438			
References/ Readings:	1. Cole, John P. and King, Cuchlaine A. M. (1968). Quantitative Geography. John Wiley. London. 2. Gregory, S. (1978). Statistical Methods and the Geographer. Longman. London.			

	3. Haining, R. (2003). Spatial Data Analysis: Theory and Practice. Cambridge University Press. 4. Hammond, R and McCullagh, P. S. (1974). Quantitative Techniques in Geography: An Introduction. Oxford: Clarendan Press. 5. Johnston, R. J. (1973). Multivariate Statistical Analysis in Geography. London: Longman, London. 6. Lee, J., & Wong, D. W. S. (2001). Statistical Analysis with ArcView GIS. Wiley. 7. O'Sullivan, D., & Unwin, D. J. (2014). Geographic Information Analysis (2nd ed.). Wiley. 8. Rogerson, P. A. (2010). Statistical Methods for Geography: A Student's Guide. Sage Publications 9. Unwin, David (1981). Introductory Spatial Analysis. Methuen and Co. London. 10. Wong, D. W. S. (2010). Spatial Statistics for Geoscientists: An Introduction. Springer. 11. Yeats, Maurice (1974). An introduction to Quantitative Analysis in Human Geography. MacGraw Hill. New York.
Web Resources:	India's open data portal: www.data.gov.in

Discipline Specific Elective Courses

Title of the Course	Political Geography
Course Code	GOG-5205
Number of Credits	04
Theory/Practical	Theory
Level	400
Effective from AY	2025-26
New Course	Yes
Bridge Course/ Value added Course	No
Course for advanced learners	Yes

Pre-requisites for the Course:	NIL	
Course Objectives:	• Introduce the foundational concepts and theoretical approaches in political geography. • Understand the evolution of state and territorial systems, and classify frontiers and boundaries. • Explain geopolitical strategies and assess the significance of India's role in global and regional contexts. • Evaluate internal political issues in India including inter-state disputes and changing political boundaries.	
Course Outcomes:		**Mapped to PSO**
	CO 1. Define and explain important concepts in political geography.	PSO 1
	CO 2. Classify and differentiate types of boundaries and evaluate their geopolitical	PSO 1, PSO 2

	implications.			
	CO 3. Analyze India's geopolitical role in global setting (e.g., SAARC, BRICS, G-20) and strategic ocean regions.		PSO 2, PSO 3	
	CO 4. Assess and interpret internal political dynamics of India, including border and water disputes.		PSO 3, PSO 4	
Content:		**No of hours**	**Mapped to CO**	**Cognitive Level**
Module 1:	• **Introduction to political Geography:** Definition, Geography & Politics. • History & Development of Political Geography. • Approaches of Political Geography: Whittlesey's landscape approach, Functional approach, Centrifugal & centripetal forces, analysis of external functions. • Unified Field Theory.	**15**	CO 1	K1, K2
Module 2:	• **Concept Nation & State Frontiers & Boundaries:** Territoriality, State & Nation, State formation. • Nation building / Nationalism, Definition of frontiers & boundaries, Distinction between frontiers & boundaries, Genetic, functional & morphological classification of boundaries. • Global geostrategic view.	**15**	CO 2	K2, K3
Module 3:	• **Resource Development & Power Geopolitics:** Resources & National strategy. • Resource management & Power of Nation. • Significance of Indian ocean, SAARC, G-4, G-7, G- 20, BRICS. • Geopolitical and strategic significance of India.	**15**	CO 3	K2, K4

Module 4:	• **Political Geography of India:** Changing internal political map of India and emergence of new states. • Unity in diversity. • Politics of interstate: water, language, and border disputes. • Problems of border states of India.	**15**	CO 4	K2, K4
Pedagogy:	Lectures, group discussions, case studies, paper reviews, Assignments, Presentations, Blended Learning, Flipped Classroom			
Texts:	1. Prescott, J. R. V. (1972). Political Frontiers and Boundaries. 2. Glassner, M. I. (1993). Political Geography.			
References/ Readings:	1. Alexander, L. M. (1963): World Political Patterns, Ram McNally, Chicago. 2. Adhikari, Sudeepta (2012): Political Geography, Rawat Publication, Jaipur, India. 3. Dikshit, R. D. (1996): Political Geography: A Contemporary Perspective, Tata McGraw Hill, New Delhi. 4. Dikshit, R. D. (1999): Political Geography: A Century of Progress, Sage, New Delhi. 5. De Blij, H. J. and Glasson, M. (1968): Systematic Political Geography, John Wiley, New York. 6. Pounds, N. J. G. (1972): Political Geography, McGraw Hills, New York. 7. Taylor, R. J. (1989) Political Geography, Longman, UK.			
Web Resources:	United Nations Geospatial Information Section https://www.un.org/geospatial			

Title of the Course	Geography of Trade and Transport
Course Code	GOG-5206
Number of Credits	04
Theory/Practical	Theory
Level	400
Effective from AY	2025-26
New Course	No
Bridge Course/ Value added Course	No
Course for advanced learners	Yes

Pre-requisites For the Course:	NIL	
Course Objectives:	• This course will help students to understand relationship between geography, trade and transport and examine the models and theories of trade and transport. • Students will also assess alternative transport system in mega cities of India, and finally analyse recent trends in India's Foreign Trade.	
Course Outcomes:		**Mapped to PSO**
	CO 1. Explain transport concepts and modes; evaluate their economic significance.	PSO1, PSO2
	CO 2. Apply models to analyze networks; assess transport-development links.	PSO2, PSO3
	CO 3. Analyze urban transport systems; evaluate alternatives for megacities.	PSO2, PSO3

	CO 4. Evaluate trade patterns and policies; propose strategic trade solutions.		PSO1, PSO4	
Content:		**No of hours**	**Mapped to CO**	**Cognitive Level**
Module 1:	**Transportation and Geography:** Transportation and geography, Transportation and space, Transportation and Geography of Trade and Transport, Geography of transportation networks. **Significance of different modes:** Significance of transportation in world and regional economies, Transportation modes, Factors associated with their growth, Characteristics and relative significance of different modes of transport.	**15**	CO1	K1, K2
Module 2:	**Transport network and methods:** Methods in transport geography, Models of network changes, Graph theoretic measures, Traffic flow, Gravity models. Transport network and economic development. **Urban transport:** Transportation and the urban form, Transport energy and environment. Alternative transport system in mega cities of India, Transport planning and policy.	**15**	CO2	K3, K4
Module 3:	**History and development of international trade:** History and development of international trade. Trade areas and economic blocks, Various treaties of trade at international level, Geographical factors influencing, international trade. Problems and prospects of international trade in globalization. **Trade Theories:** Theory of comparative advantage-Neo-classical theory, Modern theory.	**15**	CO4	K2, K5
Module 4:	**International Trade:** World Trade Patterns. **Major Trade Block**: OPEC, ASEAN Economic Community (AEC), European Union (EU), WTO, Asia Pacific Economic Cooperation (APEC), Indian Ocean Rim	**15**	CO4	K2, K5

	Association (IORA); **India's Foreign Trade:** Trends, Composition, Direction and Changing Pattern. Challenges and prospects of foreign trade of India, Impact of trade liberalization on the geographical distribution of industries.			
Pedagogy:	Lectures, group discussions, case studies, paper reviews, Assignments, Presentations, Blended Learning, Flipped Classroom.			
Texts:	Rodrigue, J.-P. (2020). The Geography of Transport Systems. In The Geography of Transport Systems. https://doi.org/10.4324/9780429346323			
References/ Readings:	1. Bhandari, S. (1992): Transport and Regional Development, Concept Publication, New Delhi. 2. Chorley, R.J. and Haggett, P. (1968): Network Analysis, Edward Arnold, London. 3. Pande, N. P. (1991): Transport Geography, Concept Publication, New Delhi. 4. Sealy, K. R. (1968): Geography of Air Transportation. Hutchinson University Press, London. 5. Singh, K. N. (1990): Transport Network in Rural Development, Institute of Rural Economic Development, Varanasi. 6. Taffe, E. J. and Gauthier H. L. (1973): Geography of Transportation, Prentice- Hall 7. Tolley, R. S. and Turton B. J. 91989): Transport system, Policy and Planning Longman Group, Singapore 8. Vaidya, B. C. (eds.) (1998): Reading in Transport Geography: A Regional Perspective, Devika Publications, New Delhi. 9. White, H.P. and Senior, M.L. (1989): Transport Geography, Longman Group, Hong Kong.			
Web Resources:	• https://transportgeography.org/ • https://transportgeography.org/contents/chapter5/transportation-modes-modal-competition-modal-shift/ • https://appliednetsci.springeropen.com/articles/10.1007/s41109-019-0139-y • https://mohua.gov.in/upload/uploadfiles/files/TransportPolicy.pdf • https://www.orfonline.org/expert-speak/mapping-the-evolution-of-india-s-urban-transport-planning • https://ourworldindata.org/trade-and-globalization • https://www.exportplanning.com/en/magazine/article/2024/09/04/theories-of-international-trade-from-old-trade-theory-to-new-new-trade-theory/			

Title of the Course	Applied Regional Geography of India and Regional Integration
Course Code	GOG-5207
Number of Credits	04
Theory/Practical	Theory
Level	500
Effective from AY	2025-26
New Course	Yes
Bridge Course/ Value added Course	No
Course for advanced learners	Yes

Pre-requisites for the Course:		
Course Objectives:	• To provide an in-depth understanding of India's regional diversity through physical, socio-economic and cultural lenses. • To analyse regional disparities and development patterns using advanced geographical tools and techniques. • To evaluate regional planning policies and their effectiveness in addressing regional imbalances.	
Course Outcomes:		**Mapped to PSO**
	CO 1. Describe India’s physical features, climate, monsoon and drainage systems.	PSO1
	CO 2. Analyse patterns of natural resources and population distribution.	PSO4
	CO 3. Evaluate regional differences in agriculture and industry.	PSO3

	CO 4. Interpret transport, trade and marketing systems in regional integration.		PSO2	
	CO 5. Assess planning, globalization and disaster impact on regional development.		PSO2	
Content:		**No of hours**	**Mapped to CO**	**Cognitive Level**
Module 1:	Major Physiographic Regions and their Characteristics; Drainage System (Himalayan and Peninsular) Climatic Divisions, Indian Monsoon (mechanism and characteristics), Jet Streams and Himalayan Cryosphere. Types and Regions of Natural Resources: Soil, Vegetation, Mineral and Marine Resources. Population Characteristics (spatial aspects and patterns of distribution), Determinants of Population Growth and Composition (rural-urban, age, sex, occupational, educational, ethnic and religious), Current Population Problems, Population Policies in India.	**15**	CO 1, CO2	K1, K2. K4
Module 2:	Agriculture: Major Crop Regions, Regional Variations in Agricultural Development, Agro-Climatic Zones, Green Revolution and its positive and negative impacts, Food Security and Right to Food. Industrial Development since Independence, Industrial Regions & Industrial Complexes and their characteristics, Industrial Policies in India. Problems & Prospects of Industrially Backward Regions.	**15**	CO3, CO5	K5
Module 3:	Patterns of Transport Networks (railways, roadways, waterways, airways and pipelines), Regional integration of Internal movement of products and services, External Trade (trend, composition and directions); Agricultural Marketing & Industrial Product Marketing; Current Pattern of Integrated Banking in India.	**15**	CO2, CO4	K2, K4

Module 4:	Regional Development Policies in Five Year Plans, Globalisation and Multinational Companies and their impact on Indian Regions and Indian Economy. Natural Disasters in India (Earthquake, Drought, Flood, Cyclone, Tsunami, Himalayan Highland Hazards and Disasters). Unity in Diversity of India.	**15**	CO2, CO5	K5, K3
Pedagogy:	Interactive Lecture, Case Study analysis, Seminar & Discussion, Problem Based Learning, Blended Learning			
Texts:	Khullar, D. (2011). *India A Comprehensive Geography 3rd Edition.* New Delhi: Kalyani Publishers.			
References/ Readings:	1. Arunachalam, P. (2014). *Geography of India.* New Delhi: Swastik Publications. 2. Chatterjee, K. (2017). *Regional Planning.* New Delhi : Concept Publishing Company . 3. Gupta, R. (2016). *World regional geography.* New Delhi: Sonali Publications. 4. Husain, M. (2008). *Geography of India.* New Delhi: Tata McGraw-Hill Publishing Company Limited. 5. Hussain, M. (2011). *Geography of India, 2nd Edition* . New Delhi: Tata McGraw-Hill Publishing Company Limited. 6. Kant, S. (2004). *Reinventing Regional Development.* New Delhi: Rawat Publications. 7. Mcloughlin, J. B. (2019). *Urban and Regional Planning.* Jaipur: Rawat Publications 1st Edition. 8. Mishra, R. P. (1992). *Regional Planning, 2nd Edition.* New Delhi: Concept Publishing Company. 9. Singh, I. (2006). *Physical Geography of India.* New Delhi: Srishti book distributors. 10. Singh, R. S. (2009). *Indian Geography.* New Delhi : Rawat Publication . 11. Tirtha, R. (2006). *Geography of India.* New Delhi: Rawat Publications.			
Web Resources:	https://www.niti.gov.in https://missionantyodaya.nic.in https://censusindia.gov.in			

Title of the Course	Geography of Migration Studies
Course Code	GOG-5208
Number of Credits	04
Theory/Practical	Theory
Level	400
Effective from AY	2025-26
New Course	Yes
Bridge Course/ Value added Course	No
Course for advanced learners	Yes

Pre-requisites for the Course:	Nil			
Course Objectives:	• Understand migration concepts, theories, and key determinants. • Analyze causes and impacts of migration across socio-economic, environmental, and health dimensions.			
Course Outcomes:			**Mapped to PSO**	
	CO 1. Define key concepts and typologies of migration, including historical evolution.		PSO 1	
	CO 2. Explain classical and modern theories and determinants of migration.		PSO 2	
	CO 3. Apply migration theories to interpret causes and implications of migration trends.		PSO 3	
	CO 4. Analyze migration consequences on socio-economic structures and environments.		PSO 4	
Content:		**No of hours**	**Mapped to CO**	**Cognitive Level**

Module 1:	**Foundations of Migration Studies** • Introduction: Definition, nature, scope, and significance of migration, Mobility, circulation and migration, Historical evolution and patterns of migration • Types and typologies of migration: Internal vs. international, Voluntary vs. forced, Fairchild, Peterson, Crane, Gonzalez, Gould and Prothero	**15**	CO1	K1, K2
Module 2:	**Theories and Determinants of Migration** • Classical and contemporary theories of migration: Ravenstein's Laws, Lee's Push-Pull Theory, Zelinsky's Mobility Transition Model, Geographical, sociological, economic and unifying approaches • Determinants of migration: Economic, social, political, demographic and environmental factors • Significance of migration in geographical and demographic contexts	**15**	CO1, CO2,	K1, K2
Module 3:	**Patterns and Processes of Migration** • Internal migration: Patterns, problems and prospects, Rural-urban, urban-urban, rural-rural flows, Displacement, issues at origin and destination • International migration: Global trends, migration corridors, remittances, Patterns, problems and prospects • Environmental and health-related issues in both internal and international migration • Case studies: India, South Asia, global migration hubs	**15**	CO2, C03, CO4	K2, K3, K4
Module 4:	**Consequences and Governance of Migration** • Socio-economic and environmental consequences of migration: Impact on origin and destination areas	**15**	CO2, C03, CO4	K2, K3, K4

	• Refugee and forced migration: Global and national patterns, IDPs (Internally Displaced Persons) • Migration policies, international laws, and conventions: Role of governance and institutional frameworks (global and Indian perspectives), Migration and sustainable development			
Pedagogy:	Lectures, Group, discussions, tutorials, student Seminars, Presentations, Case Studies, Assignments, Problem Solving Sessions, Blended Learning, Flipped Classroom.			
Texts:	Geography of Population: Concepts, Determinants and Patterns, ***Author:*** *R.C. Chandna* Population Geography, ***Author:*** *Glenn Trewartha*			
References/ Readings:	1. Brown, A.A. ed. (l977). Internal Migration: A Comparative Perspective, New York: Academic Press. Page 7 of 62 2. Cohen, Robin (1996). Theories of Migration, Cheltenham: Edward Elga. 3. Demko, G. et. al (1977). Population Geog: A Reader. New York: McGraw Hill. 4. Harvey, David (1973). Social Justice and City. Baltimore: Edward Arnold and The Johns Hopkins University Press. 5. Jackson. J. A. (1969). Migration. Cambridge: University Press. 6. Jones,E.ed. (1975). Readings in Social Geography. Oxford: Oxford University Press. 7. Khadaria, B. (2010). India Migration Report 2009: Past, Present and Future Outlook. New Delhi: Cambridge University Press. 8. Kosinki, L.A. et.al.eds (1975). People on The Mov., London: Methuen. 9. Oberai, A.S., & Singh, H.K.M. (1983). Causes and Consequences of Internal Migration: A Study in the Indian Punjab. Delhi: Oxford University Press. 10. O'Neill, B. C. O. (2001). Population and Climate Change. Cambridge: Cambridge University Press.			
Web Resources:	1. **Census of India:** Official source of population data in India including migration tables, urbanization, and demographic indicators. 2. **National Sample Survey Office (NSSO) – India**: Migration-related survey data from Ministry of Statistics and Programme Implementation.			