



**M.Sc. GEOGRAPHY: CHOICE BASED CREDIT SYSTEM -  
LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS - LOCF)**

**(Applicable to the candidates admitted from the academic year 2022-23 onwards)**

Sem.	Courses	Title	Ins. Hrs.	Credit	Exam Hrs.	Marks		Total
						Int.	Ext.	
I	Core Course I (CC)	Geomorphology	6	5	3	25	75	100
	Core Course II (CC)	Advanced Climatology	6	5	3	25	75	100
	Core Choice Course I (CCC) (Any one choice)	1. Urban Geography 2. Demography and Population Studies	6	5	3	25	75	100
	Core Practical I (CP)	Representation of Terrain and Climatic Data	6	3	3	40	60	100
	Elective Course I (EC) (Any one choice)	1. Biogeography 2. Oceanography	6	4	3	25	75	100
	Value Added Course I (VAC)	Geography of Tourism and Pilgrimage	-	2*	3	25	75	100*
	<b>Total</b>			<b>30</b>	<b>22</b>	-	-	-
II	Core Course III (CC)	Geography of India	6	5	3	25	75	100
	Core Course IV (CC)	Advanced Cartography and GIS	5	5	3	25	75	100
	Core Choice Course II (CCC) (Any one choice)	1. Agricultural Geography 2. Industrial and Transport Geography	5	5	3	25	75	100
	Core Practical II (CP)	Field Techniques, Surveying and Research Methods	6	3	3	40	60	100
	Elective Course II (EC) (Any one choice)	1. Geography of North America and South America 2. Geography of Asia	5	4	3	25	75	100
	Non-Major Elective Course I	Geography of Tamil Nadu	3	2	3	25	75	100
<b>Total</b>			<b>30</b>	<b>24</b>	-	-	-	<b>600</b>
III	Core Course V (CC)	Geographical Thought	6	5	3	25	75	100
	Core Course VI (CC)	Research Methodology	5	5	3	25	75	100
	Core Choice Course III (CCC)	1. Regional Planning 2. Geography of Health and Wellbeing	5	5	3	25	75	100
	Core Practical III (CP)	Data Analysis in GIS	6	3	3	40	60	100
	Elective Course III (EC)	1. Principles of Remote Sensing, GIS & GNSS 2. Disaster Studies	5	4	3	25	75	100
	Non-Major Elective Course II	Disaster Studies	3	2	3	25	75	100
<b>TOTAL</b>			<b>30</b>	<b>24</b>	-	-	-	<b>600</b>
IV	Core Course VII (CC)	Social and Cultural Geography	6	5	3	25	75	100
	Core Course VIII (CC)	Geopolitics	6	5	3	25	75	100
	Entrepreneurship / Industry Based Course	Application of Geoinformatics	6	5	3	25	75	100
	Project		12	5	-	20	80	100
	Value Added Course II (VAC)	Climate Change Vulnerability and Adaptation	-	2*	3	25	75	100*
	<b>TOTAL</b>			<b>30</b>	<b>20</b>	-	-	-
<b>GRAND TOTAL</b>			<b>120</b>	<b>90</b>	-	-	-	<b>2100</b>

## SUMMARY OF CURRICULUM STRUCTURE OF PG PROGRAMMES

<b>Sl. No.</b>	<b>Types of the Courses</b>	<b>No. of Courses</b>	<b>No. of Credits</b>	<b>Marks</b>
1.	Core Courses	8	40	800
2.	Core Choice Courses	3	15	300
3.	Core Practicals	3	9	300
4.	Elective Courses	3	12	300
5.	Entrepreneurship/ Industry Based Course	1	5	100
6.	Project	1	5	100
7.	Non-Major Elective Courses	2	4	200
	<b>Total</b>	<b>21</b>	<b>90</b>	<b>2100</b>
	Value Added Courses *	2*	4*	200*

**\*The value added courses credit will not be included in the total CGPA.  
These courses are extra-credit courses.  
Instruction hours for these courses is 30 hours.**

**PROGRAMME OUTCOME:**

- The M.Sc., Geography program curriculum provides the features of progress, advanced research and employability in the domains of geography
- The program makes familiar higher level geographic concepts
- The program upscales knowledge on human and earth interaction
- The program focused to handle spatial data and non-spatial data available globally
- The program M.Sc., Geography curriculum upscales the use of geospatial software in various geographic domains

**PROGRAMME OUTCOME:**

- The M.Sc., Geography program inculcate the concepts of application of Geoinformatics in geographic research.
- The program makes familiar geography of India, appaises the sustainable resource management.
- The program provides a comprehensive understanding of geography of Tamil Nadu, the course make the students to undertake case studies for research.
- The M.Sc., Geography program makes familiar to appreciate and interpret the maps published by Survey of India at different scales.
- The M.Sc., Geography program gives confidence to the students to perform geo-statistical analysis and interpretation.
- Geoinfomatics practical courses enhance the employability of the students.

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**First Year**

**CORE COURSE I  
GEOMORPHOLOGY  
(Theory)**

**Semester I**

**Code:**

**Credit: 5**

**COURSE OBJECTIVES:**

- To introduce the basic concepts geomorphology to the students of geography
- To understand the origin of landforms, Weathering, Erosion and Depositional
- To know the applications of geomorphology is helpful in different fields like civil, mineral and coastal departments.

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**UNIT - I:**

Basics: Meaning, Scope and development – Basic Concepts and conflicting views – Endogenic process: Diastrophism and volcanism Exogenic process: Weathering and Mass Wasting.

**UNIT - II:**

River Valley and Drainage pattern: Types of Drainage Patterns: Consequent Drainage, Obsequent Drainage, Antecedent Drainage, Superimposed Drainage – River Valley Classification: Genetic, Controlling structure and Stages – Lakes: Origin, Types: tectonic, volcanic, landslides, glacial, solution, fluvial, wind, marine, organic and meteorite impacts.

**UNIT - III:**

Concepts: Morphogenetic regions – Concept of cycle of erosion: Davis, Penck - Idealized Fluvial Cycle – Peneplain and Pediplain –Slope development: classification and elements – Theories of slope evolution: Davis, Penck.

**UNIT - IV:**

Processes and Evolution of Landforms: Fluvial system-, Karst system-, Glacial system-, Aeolian system- and Coastal system-sea waves, tides and currents – sediments and types of coast.

**UNIT - V:**

Applied Geomorphology: Geomorphology in Mineral Exploration, Engineering projects, Dams and River regulation, Hydrological studies, Coastal Geomorphology, Coastal Hazard Management, Land use.

**UNIT – VI Current Contours: (For continuous internal assessment only)**

Landforms analysis-aerial and satellite data interpretation, Drainage basin morphometric and slope mapping, integrated approach of land and water resource management.

## **REFERENCES:**

1. Dayal, P., (1990). A Text book Geomorphology, Shukla Book Depot, Patna, India.
2. Ollier, C. D. (1981). Tectonics and Landforms. London: Longman.
3. Singh, S. (2002). Geomorphology, Allahabad: Prayag Pustak Bhawan.
4. Strahler, A. H., & Strahler, A. N. (1992). Modern Physical Geography, New Jersey: John Wileyand Sons.
5. Tarbuck, E. J., & Lutgens, F. K. (2009). Earth Science. New Jersey: Prentice Hall.
6. Huggett, R.J. (2007) Fundamentals of Geomorphology, Routledge, New York.
7. Khullar, D.R., (2012) Physical Geography, Kalyani Publishers, New Delhi.
8. Christopherson, R. W. and Birkeland, G. H., (2012) Geosystems: An Introduction to Physical Geography (8th edition), Pearson Education, New Jersey.
9. Das Gupta, A and Kapoor, A.N., (2001) Principles of Physical Geography, S.C. Chand & Company Ltd. New Delhi.
10. <https://pubs.usgs.gov/pp/0500b/report.pdf>
11. <https://www.wou.edu/las/phisci/taylor/g322/intro.pdf>

## **COURSE OUTCOME:**

On completion of the course the student are able to

- Understand the concepts of geomorphology
- Familiar about the landforms and its origin in different domains
- Describe about the concept of cycle of erosion and slope development
- Discuss the landforms origin in different geomorphic scenarios like fluvial, karst, coastal and Aeolian systems.
- Apply the geomorphic associations on mineral exploration and disaster management research.

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**First Year**

**CORE COURSE II  
ADVANCED CLIMATOLOGY  
(Theory)**

**Semester I**

**Code:**

**Credit: 5**

**COURSE OBJECTIVES:**

- To understand Earth's climates and the factors that influence and control them
- To understand the structure, composition and interaction of Atmosphere
- To know how they operate and change over time, and applications of climatology.

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**UNIT – I:**

Introduction Climatology - Definition – Branches – Nature, Scope and Trends and Development – Atmosphere – Composition and Structure – Insolation, Heat Budget: Mechanisms of Heat Energy Transfer – Heating and Cooling of Atmosphere and Earth – Distribution of Temperature – Horizontal and Vertical Distribution – Temperature Inversion and Albedo.

**UNIT – II:**

Atmospheric Pressure and Winds: Pressure Gradient and Variations – Vertical , Horizontal and Seasonal Variation of Air Pressure, Winds: Factors affecting Wind Motion – Geostrophic Wind – Gradient Wind – Wind Measurement – Beaufort Scale – Models of General Circulation of Atmosphere: Surface Wind System – Latitudinal Shifting of Wind Belts – Jet Stream – Monsoon – Concepts Of Origin Of Monsoon – Indian Monsoon, Local Winds.

**UNIT – III:**

Precipitation – Humidity – Definition – Types – Factors affecting Potential Evapotranspiration and Actual Evapo-Transpiration – Dew Point – Atmospheric Equilibrium: Stability and Instability – Adiabatic Process – Temperature Change – Condensation – Forms of Precipitation – Clouds – Mean Annual Precipitation – Variability – Intensity – Artificial Precipitation.

**UNIT – IV:**

Air masses and Fronts: Definition and Characteristics – Source Regions – Classification. Atmospheric Disturbances: Cyclones and Anticyclones - Temperate Cyclones- Tropical Disturbances, Movement and Track.

**UNIT – V:**

Climatology – Koppen – Thornthwaite – Trewartha Classification, Climatic System And Changes – Natural and Anthropogenic Causes, Weather Forecasting – Methods And Trends, Agro Climatology: Elements – Heat Island – Air Pollution – Green House Effects – Ozone Depletion – Human Comfort Zones.

## **UNIT VI      Current Contour (For continuous internal assessment only):**

Climate Change and Global Warming, UN frame work Convention on Climate Change, Climate Justice and Equity, Global Warming and Population, Dominance and Change in Artic, Global Dimming.

### **REFERENCES:**

1. Lal, D.S. (1996), Chaitanya Publishing House, Allahabad.
2. Collings, V.K. (1987), Weather, Radar and Flood Forecasting, John Wiley & Sons, New York.
3. Critchfield, H.J. (1996), General Climatology, Prentice Hall, New Jersey.
4. Menon, P.A. (1989), Our Weather, National Book Trust, New Delhi.
5. Smith, K., (1975), Principles of Applied Climatology, McGraw Hill Book Co., London.
6. Trewartha, G.T., (1968), An Introduction to Climate, McGraw Hill Book Co., New York.
7. T.R. Oke, G. Mills, A. Christen and J.A. Voogy, Urban Climates, Cambridge University Press; 1 edition, 2017.
8. Lutgens, Frederic K. & Tarbuck, Edward J. (2010). The Atmosphere: An Introduction to Meteorology. New Jersey: Pearson Prentice Hall.
9. Oliver, John E. & Hidore, John J. (2003). Climatology: An Atmospheric Science. Delhi: Pearson Education.
10. Singh, S. (2005). Climatology. Allahabad: Prayag Pustak Bhawan.
11. <https://swayam.gov.in/course/4242-physical-geography-ii-climatology-oceanography>
12. <https://www.britannica.com/science/climatology>
13. <https://www.ncdc.noaa.gov/>
14. <http://www.realclimate.org/>
15. <https://serc.carleton.edu/NAGTWorkshops/complexsystems/courses/42415.html>
16. <https://www.loc.gov/rr/scitech/SciRefGuides/weather.html>
17. <http://www.globalissues.org/issue/178/climate-change-and-global-warming>.

### **Course Outcome**

On completion of the course the student are able to

1. Understand the concepts of climatology, atmospheric composition, and structure.
2. Familiar about the pressure belts, wind movement and general circulation atmosphere.
3. Describe about the various forms of precipitation.
4. Discuss the types of air masses, cyclones and its types
5. Analyze the impact of climatic phenomena on human life, agriculture, and pollution.

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**First Year**

**CORE CHOICE COURSE I**

**Semester I**

**Code:**

**1) URBAN GEOGRAPHY  
(Theory)**

**Credit: 5**

**COURSE OBJECTIVES:**

- To provide an overview and theoretical framework of urban geography
- To learn the internal spatial structure and landscapes of cities
- To make understand the patterns of land use, new urbanism. Comparative models of internal city and structure of the cities.

**UNIT – I:**

Nature – Scope and development of Urban Geography – Urbanization factors of Urban growth – world urbanization patterns– urbanization in India.

**UNIT - II:**

Urban demography – Population density models – age and sex structure – Occupational structure – Economic base – Basic and Non basic function – Functional classification.

**UNIT - III:**

Urban land use – Types – Models – Social area analysis – CBD delimitation – Urban ecology – Quality of urban life.

**UNIT - IV:**

Urban expansion – Vertical and horizontal – urban sprawl – Rural urban fringe – Suburbs – City region – Umland demarcation. Hierarchy of urban centers – rank size rule – Christaller’s and Losch central place concepts.

**UNIT - V:**

Urban problems (Special reference to Metroplolitan cities in India) – Housing problems - Slums – Pollution – Water supply, transport planning.

**UNIT – VI Current Contours: (For continuous internal assessment only):**

Smart City Planning and Management, City Greening, MRTS, Green concept.

**REFERENCES:**

1. Paul L. Knox and Linda McCarthy (2011), *Urbanization: An Introduction to Urban Geography*. Englewood Cliffs, NJ: Prentice Hall, 3rd edition.
2. Misra R.P & K.V.Sundaram(1971) *Regional planning and Development*, University of Mysore.
3. Mohammed Ishar Hasan (2014) *Population geography*, Rawat Publications.
4. Richa Mehta (2014) *Population geography*, Srishti book distributors, New Delhi.



5. Urvija Shanker (2014) Population pattern and urban development, Rajesh publications.
6. Fyfe, N. R. and Kenny, J. T., (2005): The Urban Geography Reader, Routledge.
7. Graham, S. and Marvin, S., (2001): Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition, Routledge.
8. <https://www.e-education.psu.edu/emsc100tsb/node/143>
9. <https://www.wiley.com/en-us/General+%26+Introductory+Geography/Urban+Geography-c-GE23>

**COURSE OUTCOME:**

On completion of the course the student are able to

1. Understand the functions, sizes, and spatial arrangements of urban areas
2. Differentiate the characteristics of urban settlement in cities
3. Discuss the urbanization and its problems.
4. Analyze the evolving forms of present-day urban area
5. Understand how to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.

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**First Year**

**CORE CHOICE COURSE I**  
**2) DEMOGRAPHY AND POPULATION**  
**STUDIES**  
**(Theory)**

**Semester I**

**Code:**

**Credit: 5**

**COURSE OBJECTIVES:**

- To study of the ways in which spatial variations in the distribution, composition, migration and growth of populations are related to the nature of places.
- To study the characteristics of population distribution that change in a spatial context
- To analyse the population statistics, the student will explain the past trends and accurately predict the future.

**UNIT - I:**

Nature, Scope, Approaches-systematic and behavioural, Methodology and methodological problems, Techniques, Population studies and demography, Relation between population and social sciences, Population geography in India.

**UNIT - II:**

Sources of Population data-census, registration, and sample survey, Sources of Demographic data in India(Vital statistics and NSS)-unique identity, national population register and census of India, Factors affecting population distribution and density-physical, socio-cultural, demographic and physical and social stress, Population measures-CBR, CDR, NPR, age specific death rate and life expectancy, Population Growth-world, developed and developing countries.

**UNIT - III:**

Composition of population by age and sex-world pattern of sex ratio, sex ratio in India, changes in sex ratio of Indian population, age composition, age groups, trend in age structure of various countries, Occupational structure -primary, secondary and tertiary activities, India's industrial composition, labour force in India, Literacy-determinants, world pattern.

**UNIT - IV:**

Migration-determinants and patterns, types-internal and international, consequences, Lee migration theory, migration in India, Population theories-Malthus, Boserup and Demographic transition theories, Population and resources-optimum, over and under population.

**UNIT - V:**

Population and environment: population growth and human wellbeing, population growth and use and abuse of resources, impact of population growth on environment-lithosphere, atmosphere and hydrosphere, Population and development planning: manpower planning, planning for education needs,

housing needs, health service needs and infrastructure, Population policies: population policy for developed and developing countries, population policy in India.

**UNIT – VI Current Contours: (For continuous internal assessment only):**

Contemporary Issues – Ageing of Population, Gender inequality, migration issues, women empowerment, growing urban residents, environmental sustainability

**REFERENCES:**

1. Debjani Roy (2015) Population Geography, Books and Allied Private Limited, Kolkata.
2. Chandna, B.C (2012) Geography of Population, Kalyani Publishers, Ludhiana.
3. Cole, J.P. and King, C.A.M. (1968). Quantitative Geography: Techniques and Theories in Geography. John Wiley & Sons Inc, New York.
4. Mayer, H. and Kohn, C. (1959). *Readings in Urban Geography*. University of Chicago Press, Chicago.
5. Singh, R.Y. (2002). *Geography of Settlements*. Rawat Publication, New Delhi.
6. [www.worldometers.info](http://www.worldometers.info)
7. [www.census.gov/topics/sex/age](http://www.census.gov/topics/sex/age)

**Course Outcome**

On completion of the course the student are able to

- Examine the growth, age-sex structure and spatial distribution of populations.
- Describe and compare levels and age patterns in demographic processes, including marriage, fertility, mortality and migration.
- Learn to collect sources of demographic data, the assessment of data quality, standardization methods, demographic accounting, and population pyramids.
- Absorb in depth gathering of migration and its related theories.
- Assess the relationship between demographic change and policy, with special reference to India.

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**First Year**

**CORE PRACTICAL I  
REPRESENTATION OF TERRAIN AND  
CLIMATIC DATA  
(Practical)**

**Semester I**

**Code:**

**Credit: 3**

**COURSE OBJECTIVES:**

- This practical course inculcates critical knowledge of cartographical principles and techniques in representation of terrain and climatic data to the students.

- Ex. 01:** Methods of Representation of Relief
- Ex. 02:** Preparation of a Contour Map
- Ex. 03:** Representation of Relief Features by Contours
  
- Ex. 04:** Drawing of Profiles
- Ex. 05:** Calculation of Gradient and Slope
- Ex. 06:** Methods of Average Slope Determination
  
- Ex. 07:** Drawing of Hypsometric Curves
- Ex. 08:** Representation of Relief on a Block Diagram
- Ex. 09:** Representation of Climatic Data by Isopleths
  
- Ex. 10:** Climatic Line Graphs
- Ex. 11:** Columnar Diagrams
- Ex. 12:** Rainfall Dispersion Diagrams
  
- Ex. 13:** Wind-rose Diagrams
- Ex. 14:** Climographs
- Ex. 15:** Synoptic Weather Charts

**CURRENT CONTOURS (For continuous internal assessment only):**

Digital Elevation Model, Slope, Aspect

**REFERENCES:**

1. Monk House, F.J. and Wilkinson, H.R. (1973) Maps and Diagrams, Methuen & Co Ltd, London.
2. Saha, P. and Basu, P. (2014) Advanced Practical Geography, Books and Allied Ltd., Kolkatta.
3. Singh, R.L. and Singh, R. P. B. (2009) Elements of Practical Geography, Kalyani Publishers, New Delhi.
4. Gopal Singh (1998) Map Work and Practical Geography (4th Edition), Vikas Publishing House, Ahmedabad.
5. Zulfequar Ahmad Khan, M.D., (1998) Text book of Practical Geography, Concept Publishing Company, New Delhi.
6. King, C. A.M (1966) Techniques in Geomorphology, Edward Arnold, London

**COURSE OUTCOME:**

On completion of the course the student are able to

- Understand to represent relief data
- Familiar to slope calculation and able to plot profiles
- Acquire the skill to map various methods of relief representation and climatic data plotting
- Enhance the skill of mapping climatic data and rainfall analysis
- Discuss various types of wind-rose diagrams and interpret the daily weather charts.

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**First Year**

**ELECTIVE COURSE I**

**Semester I**

**Code:**

**1) BIOGEOGRAPHY  
(Theory)**

**Credit: 4**

**COURSE OBJECTIVES:**

- To understand the relation between organism and nature
- To make the students understand various biotic resources
- To know the approaches of preservation and conservation of both habitats and biotic communities which are threatened and endangered and are on the verge of extinction.

**UNIT - I:**

Biogeography: Meaning, definition, nature and scope, significance, history and development, concepts, relationship with other disciplines, branches, approach, Bio-Geographical processes: species evolution, production and distribution.

**UNIT - II:**

Energy flow: Tropic levels, food chain, food web, Biogeochemical cycle: hydrological cycle, gaseous cycle, global hydrological balance, Ecology: definition, divisions, scope and development, principles, ecological successions: stages and niche, Ecosystem: meaning, concept, properties, types, components-biotic-plant and animal system and abiotic - lithospheric, atmospheric and water components.

**UNIT - III:**

Plant Geography: origin and evolution, classification, distribution of forests in the world, floral bio geographical regions, plant extinction and conservation, case studies, Animal Geography: origin, classification, distribution of animals in the world, fauna bio-geographical regions, animal extinction and conservation, case studies.

**UNIT - IV:**

Island biogeography: definition, characteristics, development, theory, island types and conservation, Marine biogeography: definition, development, characteristics, types of ocean habitats- tropical, temperate, coastal, open ocean habitats, classification of marine organisms: on basis of trophic levels and habitats, Corals: formation, examples, threats and conservation.

**UNIT - V:**

Conservation of Biodiversity: World biomes with special reference to Indian biodiversity, biodiversity hotspots, biosphere reserves, problems, global environmental management and conservation measures, social forestry, forest policies.

## **UNIT – VI Current Contours: (For continuous internal assessment only):**

1. Climate change
2. Deforestation and habitat loss
3. Overexploitation
4. Invasive species
5. Pollution

### **REFERENCES:**

1. Savindra Singh (2009) Biogeography, PrayagPustakBhawan, Allahabad.
2. N.N.Bhattacharyya, (2014 and 2016) Biogeography, Rajesh Publications, New Delhi.
3. Richard John Huggett (2004) Fundamentals of Biogeography, Routledge, London and New York.
4. Singh, R.B (2014) Bio geography and Biodiversity, Rawat Publications, Jaipur.
5. Lapedes, D.N. (1974): Encyclopaedia of Environmental Science (eds.), McGraw Hill.
6. Mal, Suraj., and Singh, R.B. (Eds.) (2009):Biogeography and Biodiversity,Rawat Publication, Jaipur
7. Mathur, H.S. (1998): Essentials of Biogeography, Anuj Printers, Jaipur.
8. Mountain and Tree cover in Mountain Regions Report - 2002, UNEP-WCMC.
9. Haden-Guest, S., Wright, J. K. and Teclaff, E. M. (1956): World Geography of Forest Resources, New York: Ronald Press Co.
10. Hoyt, J.B. (1992): Man, and the Earth, Prentice Hall, U.S.A
11. online library.wiley.com
12. [www.britannica.com](http://www.britannica.com)
13. [www.nature.com](http://www.nature.com)
14. <https://kge.zcu.pdf>
15. [www.eci.ox.ac.uk/publications.pdf](http://www.eci.ox.ac.uk/publications.pdf)

### **Course Outcomes:**

On completion of the course the student are able to

1. Understand the basic concepts of biogeography and its multidisciplinary nature
2. Familiar on the energy flow in various ecosystem and components of bio geo chemical cycle.
3. Describe about the distribution of global flora and fauna and its status.
4. Discuss the importance of island geography and the unique ecosystem and habitat prevail over there.
5. Debate the global and national biodiversity conservation practices and its importance.

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**First Year**

**ELECTIVE COURSE I  
2) OCEANOGRAPHY  
(Theory)**

**Semester I**

**Code:**

**Credit: 4**

**COURSE OBJECTIVES:**

- The course introduce the basic concepts in physical geography
- This course on physical geography is structured to cover the components of climatology, geomorphology and oceanography.
- By studying this course, students could be able to understand about the different spheres of the earth.

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**UNIT - I:**

Introduction: Configuration of ocean floor Major expeditions, Ocean Floor Topography and Terminology – Continental Shelf, Continental Slope, Continental Margin, Continental Rise, Submarine Canyons, Mid Ocean Ridges, Trenches, Abyssal Plains.

**UNIT - II:**

Circulation of oceanic waters: Waves and Tides -Definition ,Wave theories, Classification; progressive waves, shallow water waves, Seismic Sea waves (Tsunami), wind waves, stationary waves, sea and swell, deep and shallow water waves, storm surges, Beaufort scale, spilling and breaking waves, Tides and tide generating forces, type of tides, tidal currents, rip currents.

**UNIT - III:**

Ocean Currents: Definitions, direct and indirect forces acting on sea waters, surface currents, Coriolis effect, Ekman spirals, geostrophic currents, upwelling, sinking, circulation, El-Nino, La-Nina, currents in Atlantic , Pacific and Indian oceans.

**UNIT - IV:**

Salinity and Ocean deposits: Distribution of temperature – Vertical Distribution and Horizontal Distribution, salinity and density, Classification of sediments - Lithogenic sediment, biogenic sediments, hydrogenic sediment, Manganese nodules.

**UNIT - V:**

Marine Resource & Conservation: Coral reefs- Types and distribution, Marine resource-biotic and abiotic resources, Global warming and climate change-Effects of El Nino-Cyclones- Rainfall Rhythm.

**UNIT – VI Current Contours: (For continuous internal assessment only):**

Fisheries forecasts Interpretation and use of ocean thermal structure in fisheries; Fisheries forecasting system in India and other countries-remote sensing; Global



positioning system (GPS) application of remote sensing in fisheries; Application of echo-sounder and SONAR. GNSS application in ocean studies.

**REFERENCES:**

1. Siddhartha, K (2005) oceanography a brief introduction, Kishoreya Publication Delhi.
2. Moore, J.R (1967) Oceanography W.H Freeman and Company, San Francisco.
3. Khullar, D.R., (2012) Physical Geography, Kalyani Publishers, New Delhi.
4. Das Gupta, A & Kapoor, A.N., (2001) Principles of Physical Geography, S.C. Chand & Company Ltd. New Delhi.
5. Christopherson, R. W. and Birkeland, G. H., (2012) Geosystems: An Introduction to Physical Geography (8<sup>th</sup> edition), Pearson Education, New Jersey.
6. Strahler, A. H. and Strahler, A N., (2001) Modern Physical Geography (4/E), John Wiley and Sons, Inc., New York.

**Course Outcomes:**

On completion of the course the student are able to

1. Understand part of the complex coastal environment in which human beings live and Acquire idea regarding basic processes that forms floors of deep ocean
2. Obtain knowledge regarding interactions of cold and warm currents
3. Describe about the submarine topography of major oceans.
4. Comprehend the distribution of ocean deposits
5. Discuss about the ocean deposits and understand about the importance of coral reef in global ecosystem

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**First Year**

**VALUE ADDED COURSE I  
GEOGRAPHY OF TOURISM AND  
PILGRIMAGE  
(Theory)**

**Semester I**

**Code:**

**Credit: \*2**

**COURSE OBJECTIVES:**

- To familiarize the students with aspects of tourism which have a bearing on subject matter of geography;
- To orient the students to the logistics of tourism industry and the role of tourism in regional development;
- To understand the impact of tourism on physical and human environments.

**UNIT - I:**

Scope and Nature: Concepts and Issues, Tourism, Recreation and Leisure Inter-Relations; Geographical Parameters of Tourism by Robinson.

**UNIT - II:**

Trends and Patterns: Nature Tourism, Cultural Tourism, Medical Tourism, Pilgrimage, Geo-tourism.

**UNIT - III:**

Recent Trends of Tourism: International and Regional; Domestic (India); Eco-Tourism, Sustainable Tourism, Meetings Incentives Conventions and Exhibitions.

**UNIT - IV:**

Impact of Tourism: Economy; Environment; Society.

**UNIT - V:**

Tourism in India: Tourism Infrastructure - India's World Heritage Sites and National Geological Monuments National Tourism Policy.

**UNIT - VI Current Contours: (For continuous internal assessment only):**

TTDC – PATA – World heritage news – Web information for tour planning and execution.

**REFERENCES:**

1. Kamra, K. K. and Chand, M (2007) Basics of Tourism: Theory, Operation and Practise, Kanishka Publishers, Pune.
2. Page, S. J Tourism Management (2011) An Introduction, Butterworth Heinemann–USA.
3. Jagbir S (2014) Eco-Tourism” Published by - I.K. International Pvt. Ltd. S25, Green Park Extension, Uphaar Cinema Market, New Delhi, India.

4. Nelson V (2017) An Introduction to the Geography of Tourism, Rowman & Littlefield.
5. Alan A. Lew (2017) New Research Paradigms in Tourism Geography, Routledge.
6. <http://www.iata.org/training/courses/Pages/geography-travel-planning-ttg53.aspx>
7. <http://tourism.gov.in/scheme-rural-tourism>
8. <https://serc.carleton.edu/teachearth/index.html>
9. <http://travelgeography.libsyn.com/>

### **COURSE OUTCOME:**

On completion of the course the student should be able to:

- Outline the dimensions of travel, analyse influences on tourism demand and ethnic culture and religions of major tourism destinations and finally analyse relations between consumers of tourism and the providers of tourism services
- Identify key tourism attractions from an international and global dimension and reflect on the factors that motivate tourist travel and aid their selection of a travel destination.
- Locate and identify the countries, main cities and physical features of the world continents with particular emphasis on Europe, North America, South America and Australia.
- Examine the different climatic elements that affect tourism and identify the world climatic zones and their relationship with tourism.

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**First Year**

**CORE COURSE III  
GEOGRAPHY OF INDIA  
(Theory)**

**Semester II**

**Code:**

**Credit: 5**

**COURSE OBJECTIVES:**

- To introduce diverse physiographic, climate and landscape of India
- To learn about resources in India like minerals, water, vegetation, ecosystem
- To get knowledge on economic, social and cultural setup of India.

**UNIT - I:**

Physical: Location, Physiographic Divisions, Climate: characteristics and classification; Soil and Natural vegetation.

**UNIT - II:**

Population, Urbanization: Distribution and Growth, Structure; Social: Distribution of Population by Race, Caste, Religion, Language, Tribes and their Correlates - problems of urbanization, Refugees with case studies, Town planning in India.

**UNIT - III:**

Regionalisation of India: Physiographic (R. L. Singh), Socio-Cultural (Sopher), Economic (Sengupta).

**UNIT - IV:**

Economic: Mineral and Power Resources: Distribution and Utilization of Iron Ore, Coal, Petroleum, Gas; Agricultural Production of Rice, Wheat, Cotton and Sugarcane.

**UNIT - V:**

Spatial Patterns of Industrial Development: Automobile and Information Technology.

**UNIT – VI Current Contours: (For continuous internal assessment only):**

Social issues - Population explosion - Sustainable development - Progress towards Millennium Development Goals -

**REFERENCES:**

1. Majid Husain (2014) Geography of India, Tata McGraw hill Education Pvt. Ltd, New Delhi.
2. Alka Gautam (2014) Advanced geography of India, Sharda Pustak Bhawan, Allahabad.

4. Ramanathan, R (2014) Indian transport towards the new millennium, Concept Publishing Company, New Delhi.
5. Prithvish Nag (2014) Geography of India, Concept Publishing Company, New Delhi.
6. Rupali Chatterji (2014) Geography of India, Global Academic Publishing and distribution, New Delhi.
7. Arunachalam, P (2014) Geography of India; physical, political and commercial, Swastika Publications, New Delhi.
8. Khullar, D.R. (2014): India: A Comprehensive Geography, Kalyani Publishers, New Delhi.
9. <http://www.yourarticlelibrary.com/agriculture/8-salient-features-of-indian-agriculture/20959/>**(Agriculture)**
10. <http://www.thealternative.in/business/10-technological-innovations-revolutionizing-indian-agriculture/> **(Modern techniques in Agriculture)**
11. <http://www.biologydiscussion.com/forest/loss-of-forest-cover-and-land-degradation-in-jhum-in-indias-north-east-a-case-study/1932/>**(Forest cover and land degradation)**
12. <https://www.theatlantic.com/photo/2014/12/ten-years-since-the-2004-indian-ocean-tsunami/100878/>**(Tsunami)**

#### **COURSE OUTCOMES:**

On completion of the course the students are able to

- Understand the physiography, climate and vegetative characteristics of India. get knowledge about the diversified physical and cultural landscape of India.
- Summarize the rich ethnic cultural groups, religion, language and their distribution
- Describe the vast regions in India based on various classifications by various scholars
- Appraise the reserves of resources like minerals, industries, agriculture and other economic activities of India.
- Elaborate the development in India.

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**First Year**

**CORE COURSE IV  
ADVANCED CARTOGRAPHY AND GIS  
(Theory)**

**Semester II**

**Code:**

**Credit: 5**

**COURSE OBJECTIVES:**

- To introduce the theories and techniques in fundamental map-making concepts
- To impart thorough knowledge in interpreting thematic maps
- To learn recent advancements in internet mapping and mobile mapping.
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**UNIT - I:**

Map Characteristics: Cartographic process - Map types: cadastral and utilities maps, large scale maps and small-scale maps - Thematic and temporal comparison - Digital data.

**UNIT - II:**

Map Design & Symbolization: Cartographic design - Perceptual considerations - Graphic communication - Controls on map design & planning - Colour theory - Colour and pattern use - Map elements - Symbolizing features - Mapping statistical surface: point, line, polygon symbols – Visualization methods.

**UNIT - III:**

Cartographic Production: Management and documentation of spatial information - Desktop mapping - Map production - Mapping time - Mapping change - Map animation and Cartographic modelling – Geoprocessing spatial data.

**UNIT - IV:**

GIS: Working on spatial information systems, Functions of Geospatial Information Systems: Information retrieval; Topological modelling - Data overlay - Data output - Application of GIS for sustainable development.

**UNIT - V:**

Web Mapping: Web map design - Mapping cyberspace - Geovisualization - Map as a decision tool - Web based electronic atlases - Geospatial information policy.

**UNIT – VI Current Contours: (For continuous internal assessment only):**

Open-source GIS, Web Map Publishing, Geoservers

**REFERENCES:**

1. Kumar, Dilip., Singh, R.B., and Kaur, Ranjeet., (2019) Spatial Information Technology for Sustainable Development Goals, Springer.
2. Kraak M.J. (2010) Cartography: Visualization of Geospatial Data, Pearson Education Ltd., London.

3. Robinson, A.H. et al. (1995) Elements of Cartography, John Wiley & Sons, U.S.A
4. Monkhouse, F.J. and Wilkinson, H.R. (1994) Maps and Diagrams, Methuen, London.
5. D. Tomlin., (1990): Geographic Information Systems and Cartographic Modelling, Prentice-Hall, Englewood Cliffs, NJ.
6. Heywood, I., Comelius, S., and Carver, S., (1988) An Introduction to Geographical Information Systems, Addison Wiley Longmont, New York.
7. <http://kartoweb.itc.nl/geometrics/Introduction/introduction.html>
8. [http://portal.survey.ntua.gr/main/courses/geoinfo/admcarto/lecture\\_notes/introduction/bibliography/chrisman\\_1991.pdf](http://portal.survey.ntua.gr/main/courses/geoinfo/admcarto/lecture_notes/introduction/bibliography/chrisman_1991.pdf)
9. <http://www.moray.gov.uk/downloads/file60280.pdf>

### **COURSE OUTCOME:**

On completion of the course the students are able to

1. Understand various types of maps and the processes involved in preparing them.
2. Describe map design and symbolization processes
3. Distinguish spatial data types: Point, Line and Polygons
4. Perform spatial data generation and model spatial data to visualize using various analytical tools in a GIS system
5. Familiarize recent trend in mapping, analysing and visualizing spatial data through web

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**First Year**

**CORE CHOICE COURSE II**  
**1) AGRICULTURAL GEOGRAPHY**  
**(Theory)**

**Semester II**

**Code:**

**Credit: 5**

**COURSE OBJECTIVES:**

- To describe agriculture and its association with geography
- To understand the determining geographical factors of agriculture
- To acquire knowledge in recent issues in agriculture and sustainable development.

**UNIT - I:**

Introduction: Nature, scope and development of agricultural geography – Origin, development and spread of agricultural activities - Determinants of agriculture - Whittlessey's classification of Agricultural System.

**UNIT - II:**

Soil and Land use: Soil: structure, classification, erosion, problems and remedies - Land use and land cover - Land use classification: USGS, NRSC and Nine-fold classification - Agricultural Statistics - World Agricultural Organizations.

**UNIT - III:**

Models and Techniques: Models: Von Thunen, Olof Jonasson and Sinclair theories - Techniques: crop combination, crop ranking, crop diversification, crop concentration and agricultural productivity - Land suitability and Land capability - Role of Geoinformatics in agricultural studies.

**UNIT - IV:**

Food Security: Global pattern of food intake - Food deficit: availability and entitlement deficit - Food mile - Food shortages: causes and methods to alleviate - World food security risk - Food Aid - Agricultural Subsidies- Indian revolution and government policies.

**UNIT - V:**

Recent Developments and Issues: Agricultural Regions of India: Agro-climatic, Agro-ecological & Crop Combination Regions. Green revolution: history, merits, problems and prospects - Sustainable agriculture: Modernization in agriculture - Agriculture in India and Tamil Nadu: issues and challenges - Agro-climatic regions.

**UNIT - VI: Current Contours: (For continuous internal assessment only):**

(World Case Studies) -Food Loss and Waste -Returning to Conventional Agriculture -Trans boundary pests and diseases -The future farming technology



## **REFERENCES:**

1. Hussain, M. (2014) Systematic Agricultural Geography, Rawat Publications, Jaipur.
2. Shafi, M. (2006) Agricultural Geography, Doring Kindersley India Pvt. Ltd., New Delhi.
3. Venugopal, S (2014) Agricultural Geography, Arise Publication and Distribution, New Delhi.
4. Ilbery, B. W., (1985) Agricultural Geography: A Social and Economic Analysis, Oxford University Press.
5. Roling, N.G., and Wageruters, M.A.E., (1998) Facilitating Sustainable Agriculture, Cambridge University Press, Cambridge.
6. Burger, A., (1994) Agriculture of the World, Aldershot, Avebury.
7. <http://www.yourarticlelibrary.com/geography/whittleseys-classification-of-agricultural-regions/> (Whittleseys Classification of World Agricultural System)
8. <http://www.nrcs.usda.gov/detail/soils/use/worldsoils/> (Soil)
9. <https://En.Wikipedia.Org/Wiki/Ceategory:Agricultural-Organizations> (World Agricultural Organizations)

## **COURSE OUTCOMES:**

On completion of the course the students are able to

1. Understand the association between geography and agriculture
2. Describe the various determining factors of agriculture and land use systems
3. Elaborate theories in agricultural geography and its importance
4. Discuss the global food production, consumption and other related characteristics
5. Engage in sustainable practices relating to food production and consumption

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**First Year**

**CORE CHOICE COURSE II**  
**2) INDUSTRIAL AND TRANSPORT**  
**GEOGRAPHY**

**Semester II**

**Code:**

**(Theory)**

**Credit: 5**

**COURSE OBJECTIVES:**

- To understand the development of industries and importance of transport systems
- To distinguish types of industries by various factors and outline the relationship between industries and transport networks
- To discover the importance of transport systems in overall growth of a country

**UNIT - I:**

Introduction: Nature, scope and recent trends of industrial and transport geography - Industrial revolution: economic changes and impact on transportation - Factors associated with the development of industries and transport system - Industrialization, transportation and regional development.

**UNIT - II:**

Manufacturing Industries: Manufacturing major inputs in industry - Factors affecting location of industries - Theories and models of industrial location - Weber's Theory: small and medium - Industries, Heavy Industries: Coal and Iron based industries, Rural based Industries, Footloose Industry- Globalization in manufacturing industries -Industrial hazards.

**UNIT - III:**

Transportation Systems, Structure and Process: Relative significance of different modes of transport - Intermodal transportation - Transport costs - Theories related to freight rate structure - Terminal costs - Transportation and spatial structure: linkages, nodes and hinterlands - Idealized process of transport development.

**UNIT - IV:**

Transport Network: Network structure- Measurement of connectivity -Graph theoretic measures: gamma and alpha index -Measurement of accessibility - matrix measures: accessibility and shortest-path matrix -Allocation models - Gravity models - Ullman's triad - Applications of gravity model.

**UNIT - V:**

Urban Transport Systems and Recent Trends: Urban mobility - Growth of urban transportation -Environmental problems - Transport policy and planning - Transport system in mega cities of India - Recent trends: Application of GIS and GNSS in transport planning.

## **UNIT – VI Current Contours: (For continuous internal assessment only):**

Ease of transport and services - Foreign investment in industrialization – modern transportation systems -

### **REFERENCES:**

1. Tapas Pal (2015) Industrial Geography: An Indian Perspective, Bridge Centre, Buzau.
2. Taaffe, E.J., H.L. Gauthier and M.E. O'Kelly (1996) Geography of Transportation, 2<sup>nd</sup> Edition, Prentice Hall, New Jersey.
3. Rodrigue, J.P., Claude C. and Brian S. (2006) The Geography of Transport Systems, Routledge, New York.
4. Ullman, E.L. (1980) Geography as Spatial Interaction, University of Washington Press, Seattle.
5. Sharma, T.C., (2013): Economic Geography of India, Rawat Publication, Jaipur
6. Thoman, R.S., Conkling E.C., and Yeates. M.H., (1968): Geography of Economic Activity, McGraw Hill Book Company, 1968.
7. Truman, A. Harishorn, John W. Alexander., (2000): "Economic Geography", Prentice Hall of India Ltd., New Delhi.

### **COURSE OUTCOMES:**

On completion of the course the students are able to ]

1. Understand the factors determining locations of industries and their development
2. Describe the types of industries and role of transport networks in development
3. Elaborate theories in transport models and analyse them
4. Examine the interrelationship between industries and transport networks
5. Appraise urban transport systems and recent developments in transport methods

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**First Year**

**CORE PRACTICAL II  
FIELD TECHNIQUES, SURVEYING AND  
RESEARCH METHODS**

**Semester II**

**Code:**

**(Practical)**

**Credit: 3**

**COURSE OBJECTIVES:**

- To impart knowledge and practical skill in handling various tools of classical surveying
- To understand various measuring and ranging methods for mapping linear, angular and elevation units
- To know the recent advancements in surveying and data handling methods

**UNIT – I**

**Ex. 01:** Chain Surveying and Triangulation

**Ex. 02:** Measurement of Bearings and Angles using Prismatic Compass

**UNIT – II:**

**Ex. 03:** Plane Table Surveying

**Ex. 04:** Dumpy Level Survey

**UNIT – III:**

**Ex. 05:** Measurement of Slope using Abney Level

**Ex. 06:** Determination of Height using Indian Pattern Clinometer

**UNIT – IV:**

**Ex. 07:** Laser Distance Measurements

**Ex. 08:** Handheld GNSS Surveying

**UNIT – V:**

**Ex. 09:** DGPS Surveying and Post processing

**Ex. 10:** Total Station Surveying

**UNIT – VI: Current Contours: (For continuous internal assessment only):**

Latest Technologies used in survey

**REFERENCES:**

1. Punmia, B.C., Ashok, J.K. and Arun, K.J. (2005) Surveying-1, Vol. 1, Laxmi Publications, New Delhi.
2. Rampal, K.K (2011) Surveying, Pragati Prakashan, Meerut.
3. Ghilani, C.D. and Wolf, P.R. (2012) Elementary Surveying: An Introduction to Geomatics, 13<sup>th</sup> ed., Pearson Education, Inc., New Jersey.
4. Wells, D.E., et al. (1986) Guide to GPS Positioning, Canadian GPS Associates, Canada

5. L. R. Singh (2010) Fundamentals Of Practical Geography, sharda pustak bhawan.

**COURSE OUTCOMES:**

On completion of the course the students are able to

1. Describe various surveying concepts, methods, tools and its applications.
2. Handle tools, perform survey and map them on the 2-dimensional sheets.
3. Acquire spatial data and portray them on the maps with appropriate sketches
4. Measure linear, angular and elevation details using modern instruments
5. Import the acquired data into the GIS systems and perform digital analysis

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**First Year**

**ELECTIVE COURSE II  
1) GEOGRAPHY OF NORTH AMERICA  
AND SOUTH AMERICA**

**Semester II**

**Code:**

**(Theory)**

**Credit: 4**

**COURSE OBJECTIVES:**

- Understanding North America and South America is important because of its current economic status and strategies used for global dominance.
- This course will help students to get knowledge about the physical, political, economic, social and cultural resources of these continents.

**UNIT - I:**

Political Landscape: Location and extent, Boundaries, Countries and capitals; Physical Landscape: Relief features Natural Vegetation: Regions and classification. Soil: Soil Types and Distribution - Drainage: Rivers, Importance of Panama Canal, Climate: Seasons, Climatic Regions Strategic Importance

**UNIT - II:**

Cultural Framework: Language, Religion, Races, Ethnicity Population: Distribution, Density and Growth of population, Urbanisation: Level of Urbanisation, Major cities and Migration.

**UNIT - III:**

Agriculture: Major crops, Agricultural regions and its and Contemporary Issues Major Environmental Issues: Challenges to Biodiversity, Climate Change, Disaster Preparedness

**UNIT - IV:**

Mineral and Power Resources: Important Minerals and its distribution, Industries: Major industries and Industrial regions.

**UNIT - V:**

Transportation: Roadways, Railways, Waterways, Airways and Inter-continental transportation. Border Related Issues: Territorial and Maritime Disputes

**UNIT - VI Current Contours: (For continuous internal assessment only):**

CASE STUDIES - North America: Appalachian Poverty Environmental Degradation in Mexico City - Income disparities and regional challenges Low income in Canada - Canada pluralistic society Dearborn effect City types and American College Towns - Challenges and developed realm - Mexico Maquiladora - Urbanization in United States. CASE STUDIES - South America: High altitude life zones in Andes- Environmental issues in river Amazon - Trans Amazon Highway - Shanty towns in Brazil: Favela - Health and development in low lands

of South America - Latin American children - Return migration and global economy

#### **REFERENCES:**

1. Douglas. L.J., (2009) World Regional Geography, 10<sup>th</sup> Edition, Pearson Education Inc., New Jersey.
2. Hussain M. (2015) World Geography, 5<sup>th</sup> Edition, Rawat publications, Jaipur.
3. Isaiah Bowman (2018) South America: A Geography Reader, Creative Media Partners, LLC, 2018
4. Thomas F. McIlwraith (2001) North America: The Historical Geography of a Changing Continent Rowman & Littlefield Publishers; Second edition
5. Susan W. Hardwick (2012) Geography of North America, The: Environment, Culture, Economy, Pearson.
6. [www.worldatlas.com](http://www.worldatlas.com)
7. [www.nature.org](http://www.nature.org)
8. [www.americangeosciences.org](http://www.americangeosciences.org)
9. [www.tandfonline.com](http://www.tandfonline.com)
10. [www.worldpopulationreview.com](http://www.worldpopulationreview.com)

#### **COURSE OUTCOMES:**

1. Get an introduction to the main regions of North and South America in terms of both their uniqueness and similarities.
2. Familiarize with the historical, economic, cultural, social and physical characteristics of North and South American countries, notably how they came to be, their main role and function and how they are changing.
3. Understand the current economic status and strategies used for North American global dominance.
4. Analyse the role of North and South America in the global economy today.
5. Provides the necessary geographic foundations to build an informed view of the unique role of United States of America in the global current events, including recent trends in globalization and multiculturalism.

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**First Year**

**ELECTIVE COURSE II  
2) GEOGRAPHY OF ASIA  
(Theory)**

**Semester II**

**Code:**

**Credit: 4**

**COURSE OBJECTIVES:**

- Asia is one of the major crossroads of the world. It has about 60 percent of the world's population with diverse physical and cultural landscape.
- The student will be able to understand the role of Asia today and tomorrow.
- The study on physical, political, economic, social and cultural setup of the world's largest continent will provide a platform to the students to understand the intra-regional and inter-regional linkages that exist in Asia.

**UNIT - I:**

Physical Landscape: Setting and situation of Asia - Strategic importance of its location - Asia is a continent of contrast - Geo-politics - Physiographic divisions - Climate: major climatic regions - Natural vegetation: flora and fauna.

**UNIT - II:**

Soil and Agriculture: Soil: types, characteristics and problems - Agricultural determinants - Major crops and distribution - Agricultural regions - Agricultural System in Asia and Contemporary Issues.

**UNIT - III:**

Minerals and Industries: Minerals: location, distribution and issues - Power resources - Industries: major industries and their location - problems and future.

**UNIT - IV:**

Transport and Trade: Transport: types and major routes - Major ports and harbours - Tourism - Trade: major imports and exports - SAARC: Role, Challenges and Potentialities in Regional Integration.

**UNIT - V:**

Social and Cultural Issues in Asia: Population: distribution, population pyramids, poverty and policies with case studies - Languages - Urbanization Pattern and Contemporary Issues - Natural and Human Hazards - Border Related Issues: Territorial and Maritime Disputes Major River System and Trans-Boundary River Water Issues.

**UNIT - VI Current Contours: (For continuous internal assessment only):**

(With Case Studies) - Lack of transparency and accountability in government;- Persistent poverty and rising income inequality -Exclusion of women from political and economic life -Ethnic and religious conflicts-Access to justice and human rights - Disaster management, climate change, and water resource management.



## REFERENCES:

1. Douglas. L.J., (2009) World Regional Geography, 10<sup>th</sup> Edition, Pearson Education, Inc., New Jersey.
2. Hussain M. (2015) World Geography, 5<sup>th</sup> Edition, Rawat publications, Jaipur.
3. Bradnock, R. W. (2016). The Routledge Atlas of South Asian affairs. London: Routledge Publication.
4. Farmer, B. H. (1993). An Introduction to South Asia. London: Routledge Publications.
5. Gonsalves, F., & Jetly, N. (1999). The Dynamics of South Asia: A Regional Co-operation and SAARC. New Delhi: Sage.
6. Johnson, B. L. C (1981). South Asia. Exeter: Heinemann Educational Books Ltd.
7. Mollinga, P. A. (2000). Water for Food and Rural Development Approaches and Initiatives in South Asia, New Delhi: Sage.
8. Shafi, M. (2000). Agriculture Geography of South Asia. New Delhi: McMillan India.
9. <http://www.mapsofworld.com/physical-map/asia.htm> (Physical of Asia)
10. <http://www.Biologydiscussion.com/soil/what-are-the-main-causes-of-soil-degradation/7276> (Soil of Asia)
11. <http://www.conserve-energy-future.com/causes-effects-solutions-of-desertification.php> (Natural Vegetation of Asia)
12. <https://en.reference.com/geography/asia-s-major-crops-af5b5635da6760b9> (Agriculture of Asia)

## COURSE OUTCOMES:

1. Enable the student to demonstrate the physical base, Resources and the status of Asia in the 21<sup>st</sup> century amidst the existing socio-economic instability.
2. Understand how Asian economies have grown more consistently during the past decades.
3. Explore various historical and contemporary issues on Asia with several key themes and theoretical lenses that include geopolitics, and transboundary environmental issues.
4. Critically explore the ideas and forces that have emerged Asia as a world region and locate major geographic features of the region.
5. Investigate specific issues- economic, political, social, cultural, and environmental issues of Asia and their interconnectivity.

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**First Year**

**NON-MAJOR ELECTIVE COURSE I  
GEOGRAPHY OF TAMIL NADU**

**Semester II**

**Code:**

**(Theory)**

**Credit: 2**

**COURSE OBJECTIVES:**

- To introduce diverse physiographic, climate and landscape of Tamil Nadu
- To learn about resources in Tamil Nadu like soil, mineral, water, vegetation, ecosystem
- To get knowledge on economic, social and cultural setup of Tamil Nadu

**UNIT – I:**

Location: Setting and situation, Administrative and Physiographic divisions, Weather and climate, Geology-Vegetation and forests, Drainage: Rivers in Tamil Nadu.

**UNIT – II:**

Soil & Agriculture: Soil: types, characteristics and problems, conservation, Agriculture: salient features, determinants, irrigation, major crops and their distribution, Agricultural regions, problems and remedies, latest techniques-Green revolution, aquaculture, sericulture, horticulture, poultry farming, dry farming and agribusiness.

**UNIT – III:**

Irrigation & Population: Source of irrigation, Distribution of population.

**UNIT – IV:**

Power and Industries: Source of Power- Thermal, Atomic, Hydel, Solar and wind power. Industries: determinants, evolution, policies, distribution of major industries, industrial regions, problems and multinational corporations.

**UNIT – V:**

Transport, Trade and Tourism: Transport: Road, railways, waterways and airways, Communication, Trade: major exports and imports, international trade, policies, Tourism: types, problems, eco- tourism.

**UNIT – VI Current Contours: (For continuous internal assessment only):**

Human hazards – pollution and types, Environmental degradation: increasing greenhouse gases, acidification, ozone depletion, disposal of waste, soil erosion, salinization, deforestation and desertification

**REFERENCES:**

1. Geography of Tamil Nadu - An introduction - V. Kumaraswamy. Sakthi Publishing House, Kumbakonam

2. Tiwari and Ramesh (1985), Basic Resource Atlas of Tamil Nadu
3. Indira Viswanathan Peterson, Martha Ann Selby (2008) Tamil Geographies Cultural Constructions of Space and Place in South India, SUNY Press.
4. K. Rajan, P. Balamurugan (2019) Historical Geography of Vaigai River Valley, Sharada Publishing House.
5. Diana L Eck (2012) India A Sacred Geography, Harmony/Rodale.

**COURSE OUTCOMES:**

On completion of the course the students are able to

1. Describe physical settings, climate and positional importance of Tamil Nadu
2. Understand the reserves of resources available in Tamil Nadu
3. Discuss the distribution of industries and its economic value
4. Assess the industrial setups in Tamil Nadu
5. Evaluate future developmental policies of Tamil Nadu

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**Second Year**

**CORE COURSE V  
GEOGRAPHICAL THOUGHT  
(Theory)**

**Semester III**

**Code:**

**Credit: 5**

**COURSE OBJECTIVES:**

- To study the history and philosophy of geography and its sub-disciplines.
- To know the contributors and the evolution of geography through time.
- To understand contemporary research in human and physical geography.

**UNIT – I THE FIELD OF GEOGRAPHY:**

Nature –Branches- Approaches- Development of Geographical Thought: Classical period- Medieval period- Greeks, Roman and Arab. Impacts of exploration and discoveries in geographical development -Evolution of Geographical Thinking and Disciplinary Trends in Germany, France, Britain, United States of America.

**UNIT – II FOUR TRADITIONS IN GEOGRAPHY:]**

Man – Land. Area studies, Spatial and Earth sciences. - Dualism in Geographical Studies: Determinism Vs Possibilism - Physical Vs Human - Systematic Vs Regional -Ideographic VS Nomothetic - Quantitative Vs Qualitative, Visual Vs Digital.

**UNIT – III MAJOR GEOGRAPHICAL THOUGHTS: AMERICA:**

Davis – Bowman – Hortsone, **British:** Mackinder, Herbertson, Roxby. **German:** Humbolt, Ritter, Penck. **France:** Vidal de la Blache, Jean Brunches, Albert Demangeon. **Indian:** R.L. Singh, R.P. Mishra, A. Ramesh, R. Vidhyananthan – Geographical societies in India

**UNIT – IV QUANTITATIVE REVOLUTION:**

Concept- Hypothesis- laws- theories and models in geography- Behaviouralism, Interpretation, Description and Explanation- System approach and analysis- Inductive and deductive approaches

**UNIT – V RECENT TRENDS IN GEOGRAPHY:**

Applied geography and applied research - Paradigms in Geography – Geography and Sustainable development Goals(SDG) – Geoinformatics - Online resources – Changing Concept of Space in Geography, future of geography and geographers

**UNIT – VI Current Contours: (For continuous internal assessment only):**

Modern geography- Role of remote sensing- GIS- GNSS- Application – Web resources- planning

**REFERENCES:**

1. Freeman. R (1970): Hundred year of Geography, Hutchinson. London.

2. Hartshorne, Richard (1959): Perspectives on the Nature of Geography, USA: Association of American Geographers.
3. Harvey, David (1969): Explanation in Geography, London: Arnold.
4. Hussain. M (2015): Evolution of Geographical Thought, Rawat Publications.
5. Sudepta Adhikari (2015): Fundamentals of Geographical Thought, Orient blackswan private limited.
6. Wayne, Davis K.D. (1972): Conceptual Revolution in Geography, University of London press, London.
7. Dikshit, R. D., (1997): Geographical Thought: A Contextual History of Ideas, Prentice– Hall India.
8. Holt-Jensen, A., (2011): Geography: History and Its Concepts: A Students Guide, SAGE.
9. Kapur, A., (2001): Indian Geography Voice of Concern, Concept Publications.
10. Martin Geoffrey J., (2005): All Possible Worlds: A History of Geographical Ideas, Oxford.
11. [http//Evolution Of Geographical Thought By Majid Husain PDF, ePub eBook](http://Evolution Of Geographical Thought By Majid Husain PDF, ePub eBook)
12. <http// Physical Geography and the Geographic Thought Course>
13. <https://www.youtube.com/watch?v=8Dg-lJh6IF8>, *Modern Geographical Thought*.

### **COURSE OUTCOMES:**

On completion of the course the student are able to

- Understand about different schools of geographical thought.
- Familiarise theoretical concepts of geography nature of the discipline.
- Discuss traditional and modern trends in Geography discipline.
- Analyse the importance of Quantitative revolution in geography.
- Justify the application of research techniques in geographical research.

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**COURSE OBJECTIVES:**

- To understand the basic concept of research, types and its methods.
- To gain knowledge in various stages of designing a research.
- To give an idea about methods of data collection and its processing methods.

**UNIT – I RESEARCH:**

Meaning – need for scientific research – types of research – methods of geographical studies; Inductive and deductive approaches- traditional and scientific – identification of fields, sub field and themes.

**UNIT – II LOGIC IN RESEARCH:**

Hypothesis, concepts and facts, principles, law, theory and their implication in geographical research – the science of geography – role of models – research trends in geography.

**UNIT – III RESEARCH DESIGN:**

Selection of the topic – statement of the problem – formulation of hypothesis, testing of hypothesis – time schedule – literature survey – role of internet – bibliography.

**UNIT – IV DATA ACQUISITION AND ANALYSIS:**

Collection of data – sources of data; primary and secondary – structuring the data – data transformation – quantitative revolution in geography – quantitative techniques in analysis of data; sampling techniques – correlation, regression – digital elevation model

**UNIT – V THESIS WRITING:**

Organization of the thesis; the preliminaries, text and reference materials – drafting of thesis – final evaluation – language and presentation (form and style) – writing of abstract, reports – research – research project proposal- Scientific journals (Impact Factor, Citation)

**UNIT – VI Current Contours: (For continuous internal assessment only):**

Interdisciplinary Approach - Advancement in GI – Technology - Handling with Real Time Data - e-Resouces and Communication - Diversity in Research - Concentration of Research in Large Scale - Modelling in Geography - Research Ethics

## REFERENCES:

1. Anderson, J., Durston, B.H. and Poole, M., (1970) Thesis and Assignment Writing, Wiley Eastern Ltd., New Delhi.
2. Cooray, P.G., (1992). Guide to Scientific and Technical Writing, Hindagala, Srilanka.
3. Davis, W.K.D., (1972). The Conceptual Revolution in Geography, Series 1, 2, 3, 4, 5 and 6, Oxford University Press, London.
4. Daniel Montello, Paul Sutton, (2006). An Introduction to Scientific Research Methods in Geography, SAGE.
5. Basil Gomez, John Paul Jones., (2010). Research Methods in Geography: A Critical Introduction, John Wiley & Sons, New York.
6. Goudie, A. (Ed) (2004): Encyclopedia of Geomorphology, Routledge, London
7. Gregory, D., Johnston, R., Pratt, G., Watts, M. & Whatmore, S. (2009). The Dictionary of Human Geography. Singapore: Wiley-Blackwell.
8. Montello, D. and Sutton, P. (2013). An Introduction to Scientific Research Methods in Geography and Environmental Studies. SAGE Publications.
9. Warf, B. (2006). Encyclopedia of Human Geography. London: SAGE Publications.
10. <https://www.docsity.com/en/lecture-notes/subjects/research-methodology/>
11. <http://www.bbamantra.com/research-methodology/>
12. <https://libguides.wits.ac.za/c.php?g=693518&p=4914913>

## COURSES OUTCOMES:

On completion of the course the student are able to

1. Understand the need for scientific research and its types.
2. Familiarize various concepts and term related to research.
3. Comprehend various stages of designing research.
4. Analyze the various methods of data collection during research.
5. Justify the process of organizing and writing research.

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**1. REGIONAL PLANNING****Code:****(Theory)****Credit: 5****COURSE OBJECTIVES:**

- To equip the students in the regional analysis at various levels, preparation of action oriented policies, plan, strategies and management of resources.
- To provide knowledge on Sustainable Resource Management plans.
- To educate on planning for social inclusion and people participatory programs for achieving long term goals.

**UNIT – 1 BASICS OF REGIONAL PLANNING:**

Basic concept – Geographic space and regions – concept of region – Types of regions- Goals and objectives of regional planning –Regional planning process - Inter Disciplinary nature of regional planning Regionalism versus sectionalism - planning for sustainable development.

**UNIT – II REGIONAL, TECHNO-ECONOMIC AND DIAGNOSTIC SURVEYS:**

Systems concept – Geographic Data Matrix - of population Analysis, population Projection, Location analysis, Input –output Analysis, Multiplier - effort – Spatio – temporal dimensions - Grouping of dimensions in regional analysis - Methods Regional science methods to Indian regional problems – Growth pole and centre concept – Multi level planning.

**UNIT – III APPROACHES TO REGIONAL ECONOMIC DEVELOPMENT:**

Classical Geographical approaches - Economic approaches – Social approaches – Holistic approach –Comprehensive regional development – 73<sup>rd</sup> and 74<sup>th</sup> Constitutional Amendments and their implications in planning and development in India. Regional Development and Planning Strategies: Case Studies from Developed and Developing Countries

**UNIT – IV INDIAN REGIONAL DEVELOPMENT:**

Development of regional planning in India Five year plans and Annual plans – Demarcation of planning regions – Economic planning regions of India – Regional imbalances – Development programmes- integrated rural development programme , Panchayat Raj and decentralized planning , command development – planning for backward area, desert, drought-prone, hill and tribal area development.

**UNIT – V REGIONAL PLANNING IN TAMIL NADU:**

Evolution of regional planning –planning regions of Tamil Nadu -Backward area development – Panchayat Act, Municipality Act, Corporation Act, TNULB Act, land acquisition Act 1854. Provisions in the above acts related to functions powers, role and responsibilities of local bodies including elected representatives and officers local Body finance, revenue, expenditure and resource mobilization Town and Country Planning Act of Tamil Nadu 1972 - Urban Development 1972-m Urban Development Act.



## **UNIT – VI Current Contours: (For continuous internal assessment only):**

**Regions in India and its planning:** NITI Ayog-Resource Regions; Corridors as regions; National, Sub-National and State as a region; Macro, Meso and Micro regions in India. Case Studies from India.

### **REFERENCES:**

1. Misra, R. P., Sundaram, K.V.and V.L.S.Prakasa Rao, (1974) Regional Development planning in India, Vikas Publishing House Delhi.
2. Sundaram, K.V. and R.P. Misra (1976) Micro –Level planning and Development Process-Vol.1: Area Development Programme in India –A Review and Appraisal, Institute of Development Studies, University of Mysore.
3. Misra, R.P. (2002) Regional Planning –Concept, Techniques, Policies and case Studies, Concept publishing Company, Delhi.
4. Prakasa Rao, V.L.S., (1963) Regional planning, Asia Publishing House, Calcutta.
5. Mohapatra, A.C, and Jayant K. Routray (1998) Regional Development and Planning, Rawat Publications, Jaipur.
6. Nath,V (2009) Regional Development and planning in India, Concept Publishing Company , Delhi.
7. Bhat, L. S. (1973). Regional Planning in India. Kolkata: Statistical Publishing Society.
8. Chand, M. and Puri, V. K. (2003). Regional Planning in India, New Delhi: Allied Publishers Pvt. Ltd.
9. Chandana, R. C. (2000). Regional Planning- A Comprehensive Text. Ludhiana: Kalyani Publisher.
10. Dube, K. N. (1990). Planning and Development in India, New Delhi: Asia Publishing House.
11. <https://cslibguides.com/c.php?g=561010&p=3860927>
12. <http://guides.lib.berkeley.edu/city-planning>
13. <http://guides.lib.umich.edu/c.php?g=283101&p=1886114>
14. <http://www.semcog.org/>

### **COURSE OUTCOMES:**

On completion of the course the student are able to

- Understand the basic concepts of regions, its types and regional planning.
- Familiarize the concepts of spatial and temporal dimensions of regional planning.
- Analyse the approaches to regional planning and development in India.
- Justify the role of regional planning strategies and its implantation, benefits in Tamil Nadu.
- Apply the knowledge of regional planning to reduce the regional imbalances in terms of developmental programmes.

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Code:

(Theory)

Credit: 5

**COURSE OBJECTIVES:**

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

**UNIT – I PERSPECTIVES ON HEALTH:**

Definition; linkages with environment, development and health; driving forces in health and environmental trends - population dynamics, urbanization, poverty and inequality.

**UNIT – II PRESSURE ON ENVIRONMENTAL QUALITY AND HEALTH:**

Human activities and environmental pressure land use and agricultural development; industrialisation; transport and energy.

**UNIT – III EXPOSURE AND HEALTH RISKS:**

Air and water pollution; household wastes; housing; workplace.

**UNIT – IV HEALTH AND DISEASE:**

Pattern in Environmental Context with special reference to India, Types of Diseases and their regional pattern (Communicable and Lifestyle related diseases).

**UNIT – V HEALTH-CARE PLANNING:**

(i) international level-WHO, UNICEF, Red Cross (ii) National level-Government and NGOs, Health Care Planning and Policies ; availability, accessibility and utilization of health care services; Primary health care; Inequalities in health care services in India; family welfare, immunization, national disease eradication, and Health for All programmes.

**UNIT – VI CURRENT CONTOUR (For continuous internal assessment only):**

Health care geography: focuses from "disease" to "health", spatial analysis methods in health care geography: Bayesian spatial model, Uniform Model Extension of Bayesian Maximum Entropy (UMBME).

**REFERENCES:**

1. Rais, Akhtar., (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. Christaler, George and Hristopoles, Dionissios., (1998): Spatio-Temporal Environment Health Modelling, Boston Kluwer Academic Press.
4. Gatrell, A. and Loytonen, (1998): GIS and Health, Taylor and Francis Ltd, London.
5. Harpham T. and Tanner, M., (1995): Urban Health in Developing Countries; Progress and Prospects, Routledge, London.
6. Moeller, Dade, wed., (1993): Environmental Health, Cambridge, Harvard Univ. Press.
7. Murray, C. and A. Lopez, (1996): The Global Burden of Disease, Harvard University Press.
8. Narayan, K.V., (1997): Health and Development Inter-Sectoral Linkages in India. Rawat Publications, Jaipur.
9. Phillips, D. and Verhasselt, Y., (1994): Health and Development, Routledge, London.
10. <http://hetv.org/india/health-medical-web-sites.htm>
11. <https://mohfw.gov.in>
12. <http://www.who.int/classifications/icd/en/>
13. <http://www.pharmtao.com/MedInfo/index.htm>
14. <http://gamapserver.who.int/mapLibrary/default.aspx>

### **COURSE OUTCOMES:**

On completion of the course the student are able to

- Understand key concepts related to medical and health geography.
- Examine the role of human behaviour in creating and sustaining health inequalities in health care system.
- Analyse demographic, social, economic and political relationships that explains health inequalities and differences in access to health care.
- Justify how national health care systems reduce inequalities in accessibility to health care system.
- Apply the knowledge in medical geography to face and mitigate the pandemic situations.

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**Second Year**

**CORE PRACTICAL III  
DATA ANALYSIS IN GIS  
(Practical)**

**Semester III**

**Code:**

**Credit: 3**

**COURSE OBJECTIVES:**

- To gain a basic, practical understanding of GIS concepts, techniques and real world applications.
- To impart practical skills to the students which help them to map on their own with the advanced GIS software's
- To educate on analysis of spatial data quantitatively
  
- Scanning and Georeferencing
- Geodatabase Creation: Spatial Data and non-spatial data
- Digitizing: Manual and automatic.
- Attribute : Join and Relate
- Data Collection and Conversion
- Vector data editing
- Raster Data Pre-processing
- Raster Analysis
- GNSS Data Collection and integration
- Data Visualization
- Overlay analysis
- Proximity analysis
- Interpolation analysis
- Network analysis (Shortest path and service area)
- Layout

**REFERENCES:**

1. Thanappan Subash (2011) Geographical Information System, Lambert Academic Publishing,
2. Paul Longley (2005) Geographic Information systems and Science, John Wiley & Sons.
3. John E. Harmon & Steven J. Anderson (2003) The design and implementation of Geographic Information Systems, John Wiley & Sons.
4. Marble, D.F & Calkins, H.W (1990) Basic Readings in Geographic Information System, Spad System Ltd.
5. Kang Tsung Chang (2008) Introduction to Geographic Information Systems, Tata Mc Graw Hill Publishing Company Ltd, New Delhi.
6. Burrough, P.A (2005) Principles of GIS for Land Resource Assessment, Oxford Publications
7. C.P.Lo & Albert K. W.Yeung (2002) Concepts and Techniques of Geographic Information Systems, Prentice Hall India Pvt.Ltd.

8. <https://www.gislounge.com/learn-gis-for-free/>
9. <https://learn.arcgis.com/en/>
10. <http://www.esri.com/news/arcuser/0111/esripress.html>
11. [https://serc.carleton.edu/introgeo/gis/Online\\_GIS\\_Resources.html](https://serc.carleton.edu/introgeo/gis/Online_GIS_Resources.html)
12. <https://libguides.mit.edu/gis/tutorials>
13. <https://swayam.gov.in/courses/3691-introduction-to-geographic-information-systems>

### **COURSE OUTCOMES:**

On completion of the course the student are able to :

- Familiarize with concepts of map projections.
- Comprehend the fundamental concepts about GIS and its components.
- Understand the data models and data structures used for spatial data models.
- Apply knowledge in collection of data from field and process the same for preparation of various maps.
- Justify the use of various GIS models in geographical research

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Code:

(Theory)

Credit: 4

**COURSE OBJECTIVES:**

- To provide more comprehensive instruction in remote sensing, focusing primarily on the analysis and interpretation of satellite imagery to study the environment
- To introduce fundamental technologies for digital image, compression, analysis, and processing. Students will gain understanding of analytical tools and practical implementations of various digital image applications

**UNIT – 1 INTRODUCTION TO REMOTE SENSING:**

Remote Sensing Process - Analog to Digital data – Digital image data formats - Image processing system characteristics - Initial statistical extraction: histograms, univariate and multivariate statistics – Scientific visualization – Image Pre-processing: calculating radiance from DNs - atmospheric, radiometric and geometric correction.

**UNIT – II IMAGE ENHANCEMENT:**

Contrast enhancement: linear, non-linear and level slicing – Spatial feature enhancement: spatial filtering, edge enhancement and fourier and wavelet transform – Multi-image enhancement – band ratioing, principal component analysis, vegetation indices, IHS and texture transformations and image fusion.

**UNIT – III IMAGE CLASSIFICATION:**

Supervised classification: classification algorithm and training site selection - Unsupervised classification – Hybrid classification – Classification of mixed pixels: spectral mixture analysis and fuzzy classification – Post classification smoothing – Ancillary data - Classification accuracy assessment - Artificial Neural Networks – Contextual Classification - Object-Oriented Classification.

**UNIT – IV GIS & GNSS:**

LULC system – resolution considerations – environmental characteristics - change detection algorithms –data merging – GIS integration – cartographic modelling. GNSS application

**UNIT – V HYPERSPECTRAL IMAGE ANALYSIS:**

Imaging Spectroscopy - Spectral Libraries – Data Processing techniques: n-Dimensional, scatter plots, spectral angle mapping, and spectral mixture analysis - Wavelet Analysis for Hyperspectral Imagery.

## **UNIT – VI CURRENT CONTOUR (For continuous internal assessment only):**

Image Fusion, Filters for SAR processing, Spatial classification: Texture, Context, Segment/Object-based classifications. ANN classification.

### **REFERENCES:**

1. Jensen, J. R., (2006). Introductory Digital Image Processing: A Remote Sensing Perspective, 3<sup>rd</sup> Edition, Prentice-Hall Inc., New Jersey.
2. Lillisand, T.M., and Kiefer, P.W., (2007). Remote Sensing and Image Interpretation, 6<sup>th</sup> Edition, John Wiley & Sons, New York.
3. Campbell, J. B. and Wynne, R.H., (2011). Introduction to Remote Sensing, 5<sup>th</sup> Edition, The Guilford Press, New York.
4. Gonzalez, R. C. and Woods, R. E., (2007). Digital Image Processing, 3<sup>rd</sup> Edition, Prentice-Hall Inc. Upper Saddle River, New Jersey.
5. Richards, J. A. and Jia Xiuping (2005). Remote Sensing Digital Image Analysis: An
6. Introduction, 4<sup>th</sup> Edition, Springer –Verlag, Berlin.
7. Gibson, P. and Power, C. H., (2000). Introductory Remote Sensing: Digital Image Processing and Applications, Routledge Publisher, London.
8. Domenico Solimini, 2016. Understanding Earth Observation, Springer; 1<sup>st</sup> Ed.
9. Ravi Shankar Dwivedi, 2017, Remote Sensing of Soils, Springer 1<sup>st</sup> Ed.
10. <http://www.nrcan.gc.ca>
11. <https://www.e-education.psu.edu>
12. <https://swayam.gov.in/course/3723-digital-image-processing-of-remote-sensing-data>

### **COURSE OUTCOMES:**

- Analyse temporal, spectral and spatial differences of satellite data using image processing software
- Perform image pre-processing and post-processing techniques on a given satellite data
- Acquire skills to carry out the Lab Exercises independently on various Visual and digital Image processing techniques.
- Process digital satellite images for retrieving features
- Evaluate the accuracy of image classification

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**Second Year**

**ELECTIVE COURSE III  
2. DISASTER STUDIES  
(Theory)**

**Semester III**

**Code:**

**Credit: 4**

**COURSE OBJECTIVES:**

- The objective of this course is to provide students an exposure to disasters, their significance
- Various types of disaster and risk managements were discussed.
- This multidisciplinary course will also enable students to recognize the increasing vulnerability of the planet in general and India in particular to disasters.

**UNIT – I INTRODUCTION:**

Concepts and Terminologies: Disaster, Hazard, Catastrophes, Emergency, Risks, Vulnerability - Types of Disasters - Trends - Impacts: Physical, Social, Economic, Political, Environmental and Psychosocial - Resilience.

**UNIT – II NATURAL DISASTERS:**

Geophysical: Earthquakes, Tsunamis, Landslides and Volcanoes - Hydrological: Floods and Avalanches - Meteorological: Cyclones, Drought, Extreme Temperatures and Wildfires - Biological: Disease Epidemics and Insect / Animal Plagues.

**UNIT – III ANTHROPOGENIC DISASTERS:**

Atmospheric Disasters: Global Warming, Ozone Depletion, Acid Rain, Snow Melt, Sea Level Rise - Chemical / Industrial Disasters: Fire Accidents, Nuclear Disasters, Mining, Chemical Pollution, Oil spill and Industrial Waste - Biological Disasters: Deforestation, Bio-Diversity Loss and Coral / Mangrove Depletion - Others: Stampede, Conflicts, Terrorist attacks and Transport Accidents.

**UNIT – IV DISASTER RISK MANAGEMENT:**

Management Cycle: Response and recovery, Risk Assessment, Mitigation and Prevention, Preparedness Planning, Prediction and warning - Indigenous Knowledge - Community Based Disaster Management - Role of Geoinformatics - Do's and Don'ts During Disasters.

**UNIT - V DISASTER MANAGEMENT IN INDIA:**

Hazard and Vulnerability Profile of India - Institutional Framework: Disaster Management Act - Policy and Guidelines - International Strategy for Disaster Reduction.



## **UNIT – VI CURRENT CONTOUR (For continuous internal assessment only):**

Long history of standardized data compilation, validation and analysis- Rational decision-making in disaster situations - Providing information on the human impact of disasters - Creating awareness in disaster preparedness.

### **REFERENCES:**

1. Savindra S. and Jeetendra S. (2013) Disaster Management, Pravalika Publications, Allahabad.
2. Govt. of India (2008) Vulnerability Atlas of India. BMTPC, New Delhi.
3. Govt. of India (2011) Disaster Management in India. Ministry of Home Affairs, New Delhi.
4. Singh, Jagbir (2007) “Disaster Management Future Challenges and Opportunities”,. Publisher-I.K. International Pvt. Ltd New Delhi.
5. Modh, S. (2010) Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan, Delhi.
6. Kapur, A. (2010) Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.
7. Carter, N. (1991) Disaster Management: A Disaster Manager's Handbook. Asian Development Bank, Manila.
8. <http://www.ndma.gov.in/en/>
9. <http://nidm.gov.in/>
10. <https://www.unisdr.org/>

### **COURSE OUTCOMES:**

- To know about hazards, disasters and catastrophes and also Disaster Management
- Discuss about causes and effects of Earthquakes, Volcanic hazards, Landslide and GIS case studies for earthquake, volcano and landslide.
- Appraise knowledge on Origin, types, effects and damage assessment of Cyclones and Floods
- Analyse GIS based parameters and layers and flood prone area analysis and management, risk assessment and also GIS case studies for cyclones and floods.
- Describe about causes and an effect of Drought and Desertification, GIS based management strategies and also GIS case studies for drought and desertification.

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**COURSE OBJECTIVES:**

- To understand the concept, nature and manmade disasters.
- To learn the causes and effects of global warming and the warning system for ocean related natural disasters.

**UNIT – I      DISASTER:**

Concept, Types, Significance and Scope.

**UNIT – II      NATURAL DISASTERS:**

Volcanoes - Earthquake, Tsunami, Landslide, Causes and Consequences.

**UNIT – III     NATURAL DISASTERS:**

Flood, Drought and Cyclones - Causes and Consequences.

**UNIT – IV     CLIMATE CHANGE:**

Vulnerability - Global Warming and Green House Effect, Sea Level Rise and its impact on coastal areas.

**UNIT – V      DISASTER MANAGEMENT:**

Early Warning system - NIDM – SDMA – roles and responsibilities

**UNIT – VI Current Contours (For continuous internal assessment only):**

Hyogo Framework for Action (HFA), Tsunami Warning System (TWS), Oil Spil, UNFCCC and Cyclone Warning Centres (CWC)

**REFERENCES:**

1. Savindra Sing (1991), Environmental Geography, Prayag Pustak Bhavan, Allahabad.
2. Das, R.R. (2006), Environmental Studies, Pragon International Publishers, New Delhi.
3. Singh, R.P. (2006), Natural Hazards and Disaster Management, Rawat Publications, Jaipur.
4. Brig Khanna. B.K. & Nina Khanna (2011), Disasters, New India Publishing Company, New Delhi.
5. Susan.L. & Cutter (1999), Environmental Ricks and Hazards, Prentice Hall of India, New Delhi.
6. Saxena. H.M. (2007), Environmental Geography, Rawat Publications, Jaipur.

**COURSE OUTCOMES:**

On the completion of syllabus students must be able to:

- Understand the concept and types of disasters
- Analyse the causes and effects of natural disasters
- Become familiar with the nature of disasters, its causes and consequences.
- Learn the causes of global warming and its impacts.
- Able to discuss the roles and responsibilities of NIDM and SDMA.

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**Second Year**

**CORE COURSE VII  
SOCIAL AND CULTURAL GEOGRAPHY  
(Theory)**

**Semester IV**

**Code:**

**Credit: 5**

**COURSE OBJECTIVES:**

- The objectives of this course are to familiarize the students with the understanding of the society and culture through concepts and theories.
- The course describes diversity of cultures and the relationship between cultures and pattern of living and economic development.
- The students would also be able to identify the issues / problems confronting various social and cultural groups in the world as well as in India.

**UNIT – I SOCIAL GEOGRAPHY:**

Nature, scope and recent trends of social geography –Social geography in the realm of social sciences - Elements of social geography: ethnicity, tribe, dialect, language, religion and caste

**UNIT - II SPACE AND SOCIETY:**

Concept of social space - Social structure and Social processes - Geographical bases of social formation -Social differentiation and region formation - Patterns and bases of rural and urban society - Power, Identity and Social Geography: Race and Ethnicity; Geography of Gender and Sexuality

**UNIT - III SOCIAL WELL-BEING:**

Concepts of social well-being -Physical quality of life – Human development - Measurement of human development: social, economic and environmental indicators - Social geographies of inclusion and exclusion- Social Geography and Social Problems: Housing, Space and Society; Crime, Space and Inequality; Geography of Poverty

**UNIT – IV CULTURAL GEOGRAPHY:**

Nature and scope of cultural geography -Traditions of cultural geography: folk and popular culture - Components of culture - Cultural Theory; Cultural landscape: cultural areas and cultural regions - Bases of cultural diversity: race, religion and language - Globalization and cultural change: Cultural Adaptation, Cultural Assimilation, Integration

**UNIT - V SOCIO-CULTURAL PATTERNS OF INDIA:**

Evolution of socio-cultural regions of India -Indian Unity and diversity -Tribal formation - Linguistic heterogeneity - Communal and religious configuration - Social-transformation and changes in India

## **UNIT – VI CURRENT CONTOURS (For continuous internal assessment only):**

Globalization and cultural change – heritage – importance of tribal culture - Cultural Politics.

### **REFERENCES:**

1. Aijazuddin Ahmad (2012) Social Geography of India –Concept Publishing Company Pvt. Ltd, New Delhi.
2. David Atkinson (2007) Cultural Geography Rawat Publication Jaipur.
3. G.s. mohanty (2005) Social and Cultural Geography- Isha books.
4. Ahmad, A. (2012) Social Geography of India, New Delhi: Concept Publishing Company.
5. Anderson, K., Domosh, M., Pile, S., & Thrift, N. (2003) Handbook of Cultural Geography, London: SAGE Publications.
6. Jordon, G. (1995) Cultural Politics, Oxford: Blackwell.
7. Mike, C. (1998) Cultural Geography, London: Routledge.
8. Panelli, R. (2004) Social Geographies: From Difference to Action. London: Sage Publications.
9. <https://swayam.gov.in/courses/4951-social-and-cultural-anthropology>

### **COURSE OUTCOMES:**

On completion of the course the student are able to

- Understand the nature, scope, and concept, relationship between culture and social environment, and right of information act.
- To examining the cultural complex and traits of culture and its concepts.
- Discuss the social wellbeing, social inclusion social economic and environmental indicators.
- Describe the multi-dimensional nature of cultural geography
- Debate the Linguistic heterogeneity, Indian Unity and diversity and Social-transformation

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**Second Year**

**CORE COURSE VIII  
GEOPOLITICS  
(Theory)**

**Semester IV**

**Code:**

**Credit: 5**

**COURSE OBJECTIVES:**

- To get familiar with a number of contemporary political issues and their importance.
- The main purpose of this course is to enhance awareness of multi-dimensional nature of geo-political space.
- The students will understand basic concepts of political geography and understand the different characteristics of territories in a broad and integrative manner.

**UNIT - I INTRODUCTION:** Meaning, nature and scope of political geography – Recent trends, Approaches and Major traditions and Relevance of political geography in international relations. **States and Nations:** Concepts of Nations – State and Nations – Types of Nation -Elements of the State - Typology of State - Frontiers and boundaries - Unitary States and federal States - Forms of governance - Nationalism and national building.

**UNIT - II GEOPOLITICS:**

Development of geopolitics - Global strategic views: Heartland theory, Rim-land theory, Organic theory and Domino theory – Sea power: Geopolitical significance of the Indian Ocean - Recent trends in Geopolitics: Meta-geopolitics.

**UNIT - III ELECTORAL GEOGRAPHY:**

History of electoral studies - Geography of voting and representation - Geographic influences on voting pattern - Voting system in India: Factors affecting voting systems - Electoral distortion and bias: Gerrymandering and Malapportionment - Electoral mapping.

**UNIT - IV POLITICS OF DISPLACEMENT:**

Issues of relief, compensation and rehabilitation: with reference to Dams, Highways and Special Economic Zones

**UNIT - V POLITICAL REALM OF INDIA:**

Governance system in India – Changing Political maps of India - Emergence of new states - Unity and Diversity: Centripetal and centrifugal forces - Interstate issues - Federal India - Political relation of India - Geo-political problems of Border States.

**UNIT - VI CURRENT CONTOURS (For continuous internal assessment only):**

International Boarder conflicts and terrorism - Political hegemony and its impacts - Geopolitics Middle east issues

## REFERENCES:

1. Adhikari, S. (2004) Political Geography, Rawat Publication, New Delhi.
2. Sudeepth (2013) Political Geography of India –Sharda Pustak Bhawan Allahabad.
3. Agnew, J., Mitchell K. and Total G., (2003) A Companion to Political Geography, Blackwell.
4. Cox, K. R., Low M. and Robinson J., (2008) The Sage Handbook of Political Geography, Sage Publications.
5. Gallaher, C., et al, (2009) Key Concepts in Political Geography, Sage Publications.
6. Hodder, Dick, Sarah, J, Llyod and Keith, S, McLachlan., (1998): Land Locked States of Africa and Asia (vo.2), Frank Cass
7. Jones, M., (2004): An Introduction to Political Geography: Space, Place and Politics, Routledg .
8. Painter, J. and Jeffrey, A., (2009): Political Geography, Sage Publications.
9. Taylor, P. and Flint, C., (2000): Political Geography, Pearson Education.
10. Verma, M. K., (2004): Development, Displacement and Resettlement, Rawat Publications, Delhi.
11. <https://academicearth.org/political-science/>
12. <https://study.com/academy/topic/political-geography.html>
13. [https://www.colorado.edu/geography/class\\_homepages/geog\\_](https://www.colorado.edu/geography/class_homepages/geog_)
14. <https://www.tcd.ie/courses/undergraduate/az/course>

## COURSE OUTCOMES:

On completion of the course the student are able to

- Understand the nature and scope of geopolitics and concept of nation and state.
- Familiar about the development of geopolitics in a chronological scale
- Discuss the nature of electoral geography and its importance
- Understand the politics of displacement.
- Debate the political realm of India.

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**Second Year**

**ENTREPRENEURSHIP /  
INDUSTRY BASED COURSE  
APPLICATIONS OF GEOINFORMATICS  
(Theory)**

**Semester IV**

**Code:**

**Credit: 5**

**COURSE OBJECTIVES:**

- The student will know the technological synthesis of remote sensing, GIS and GNSS.
- To introduce the basic concepts of Geoinformatics and its applications.
- To enable the students to apply the modern tools and techniques in spatial analysis

**UNIT – I GEOSCIENCES:**

Concepts in Geomorphology, landform analysis- Aerial/Satellite data interpretation, Drainage basin morphometry and slope mapping, integrated approach for landslide hazard zonation mapping.

**UNIT – II WATER RESOURCES:**

Watershed Hydrology and Physical process in watershed, Geospatial technological applications in water resources assessment. Organization and design of spatial and non-spatial data in water resources.

**UNIT – III AGRICULTURE AND SOIL:**

Spectral characteristics of crop, crop inventory, physiographic soil mapping. Crop water management, Agro ecological zoning and land evaluation.

**UNIT – IV FOREST:**

Vegetation classification and mapping, forest inventory and sampling techniques, growing stock estimation, biomass estimation, forest management, fire risk zonation, land evaluation for forestry, landscape analysis, wild life habitat suitability Analysis.

**UNIT – V URBAN MAPPING AND DISASTER MANAGEMENT:**

Large scale (LIS) mapping for cadastral database, traffic and parking surveys, Urban land use classification monitoring and change detection analysis, Utility Planning, Integrated development planning, urban land conservation, transportation planning. - Disaster Management – Natural and Manmade, Types, Zoning, Preparedness.

**UNIT – VI CURRENT CONTOUR (For continuous internal assessment only):**

Defence / Military - Terrorism Search, Virtual Reality - Simulating military and training in a 3D environment using GIS data, Georeferenced Video – Cataloging and retrieving full motion video using the ArcGIS Full Motion Video Add-In or Hexagon Geospatial GeoMedia Motion GeoVideo Analyst.

## **REFERENCES:**

1. Andy D. Ward and Stanley W. Trimble (2004) Environmental Hydrology, second edition, Lewis Publishers.
2. Margareb Kalacska, G. Arturosanchez (2005) Hyper spectral RS of tropical and sub-tropical forest.
3. Subudhi A P, Sokhi, Roy P S (2001) Remote Sensing and GIS applications in Urban and Regional studies.
4. Thomas M. Lilles and Ralph E. Kiefer (2004) Remote Sensing and image interpretation, John Wiley & Sons, USA
5. Tien Bui, D., Ngoc Do, A., Bui, H.-B., Hoang, N. (2017) Advances and Applications in Geospatial Technology and Earth Resources

## **COURSE OUTCOMES:**

On completion of the course the student are able to

- Describe the fundamental concepts of Geographic Information System and Technology.
- Perform creation and acquisition of spatial data.
- Discuss about spatial analysis applicable to various domains.
- Demonstrate basic proficiency in map creation and design principles, including thematic map display, employment of map projections, and cartographic design.
- Critically evaluate and analyse data quality for their GIS project

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Code:

Credit: 5

Each candidate shall be required to take up a Project Work and submit it at the end of the final year. The Head of the Department shall assign the Guide who, in turn, will suggest the Project Work to the student in the beginning of the final year. A copy of the Project Report will be submitted to the University through the Head of the Department on or before the date fixed by the University.

The Project will be evaluated by an internal and an external examiner nominated by the University. The candidate concerned will have to defend his/her Project through a Viva-voce.

**ASSESSMENT / EVALUATION / VIVA-VOCE:****1. PROJECT REPORT EVALUATION (Both Internal & External):**

- |  |            |
|--|------------|
| I. Plan of the Project   | - 20 marks |
| II. Execution of the Plan/collection of Data / Organisation of Materials / Hypothesis, Testing etc and presentation of the report. | - 45 marks |
| III. Individual initiative   | - 15 marks |

**2. VIVA-VOCE / INTERNAL& EXTERNAL** - 20 marks**TOTAL** - 100 marks**PASSING MINIMUM:**

Project	<b>Vivo-Voce 20 Marks</b> 40% out of 20 Marks (i.e. 8 Marks)	<b>Dissertation 80 Marks</b> 40% out of 80 marks (i.e. 32 marks)
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A candidate shall be declared to have passed in the Project work if he/she gets not less than 40% in each of the Project Report and Viva-voce but not less than 50% in the aggregate of both the marks for Project Report and Viva-voce.

A candidate who gets less than 40% in the Project must resubmit the Project Report. Such candidates need to defend the resubmitted Project at the Viva-voce within a month. A maximum of 2 chances will be given to the candidate.

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**Second Year**

**VALUE ADDED COURSE II  
CLIMATE CHANGE VULNERABILITY  
AND ADAPTATION**

**Semester IV**

**Code:**

**(Theory)**

**Credit: 2**

**COURSE OBJECTIVES:**

- Understand the climate change and its physical, economic and social vulnerabilities;
- Diagnose the impacts of climate change on various spheres of the earth;
- Appreciate the global, national and local adaptation and mitigation efforts and plans of the Governments.

**UNIT – I SCIENCE OF CLIMATE CHANGE:**

Understanding Climate Change-Green House Gases and Global Warming; Global Climatic Assessment – IPCC

**UNIT – II CLIMATE CHANGE AND VULNERABILITY:**

Physical Vulnerability; Economic Vulnerability; Social Vulnerability

**UNIT – III IMPACTS OF CLIMATE CHANGE:**

Agriculture and Water; Flora and Fauna; Human Health

**UNIT – IV ADAPTATION AND MITIGATION:**

Global Initiatives with Particular Reference to South Asia.

**UNIT – V NATIONAL ACTION PLAN ON CLIMATE CHANGE:**

Local Institutions (Urban Local Bodies, Panchayats)

**UNIT – VI CURRENT CONTOURS (For continuous internal assessment only):**

Assessment of climate change with Indian context

**REFERENCES:**

1. IPCC (2014) Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge.
2. IPCC. (2007) Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge.
3. Malhotra, Nitasha and Sen, Shyamoli, 2018: Climatology, R.K. Books, New Delhi.

4. OECD. (2008) Climate Change Mitigation: What Do we Do? Organisation and Economic Co-operation and Development ([www.oecd.org/env/cc](http://www.oecd.org/env/cc)).
5. Palutik, J. P., Vander Linden, P. J. and Hanson, C. E. (eds.), Cambridge University Press, Cambridge.
6. Sen Roy, S. and Singh, R.B. (2002) Climate Variability, Extreme Events and Agricultural Productivity in Mountain Regions, Oxford & IBH Pub., New Delhi.
7. Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) (2014) Climate change and biodiversity: Proceedings of IGU Rohtak Conference, Volume 1. Advances in Geographical and Environmental Studies, Springer, Basel.
8. UNEP. (2007) Global Environment Outlook: GEO4: Environment for Development, UNITED Nations Environment Programme, Nairobi.

### **COURSE OUTCOMES:**

On completion of the course the student are able to

- Familiar about the drivers of Climate Change and its impacts and future risks
- Understand about the impact of climatic change on various domains of natural systems.
- Analyse the adaptation and mitigation at global and local scale with focus to Asia.
- Understand the importance of national action plan to mitigate climate change impacts.

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